

WORLD FOOTWEAR

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THE MAGAZINE FOR THE GLOBAL SHOE INDUSTRY



Life and sole: space for all soling materials

3D printing could change footwear's DNA

A one-stop shop at Torielli

Italian brands must make more of 'Made in Italy'



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Image: Micam

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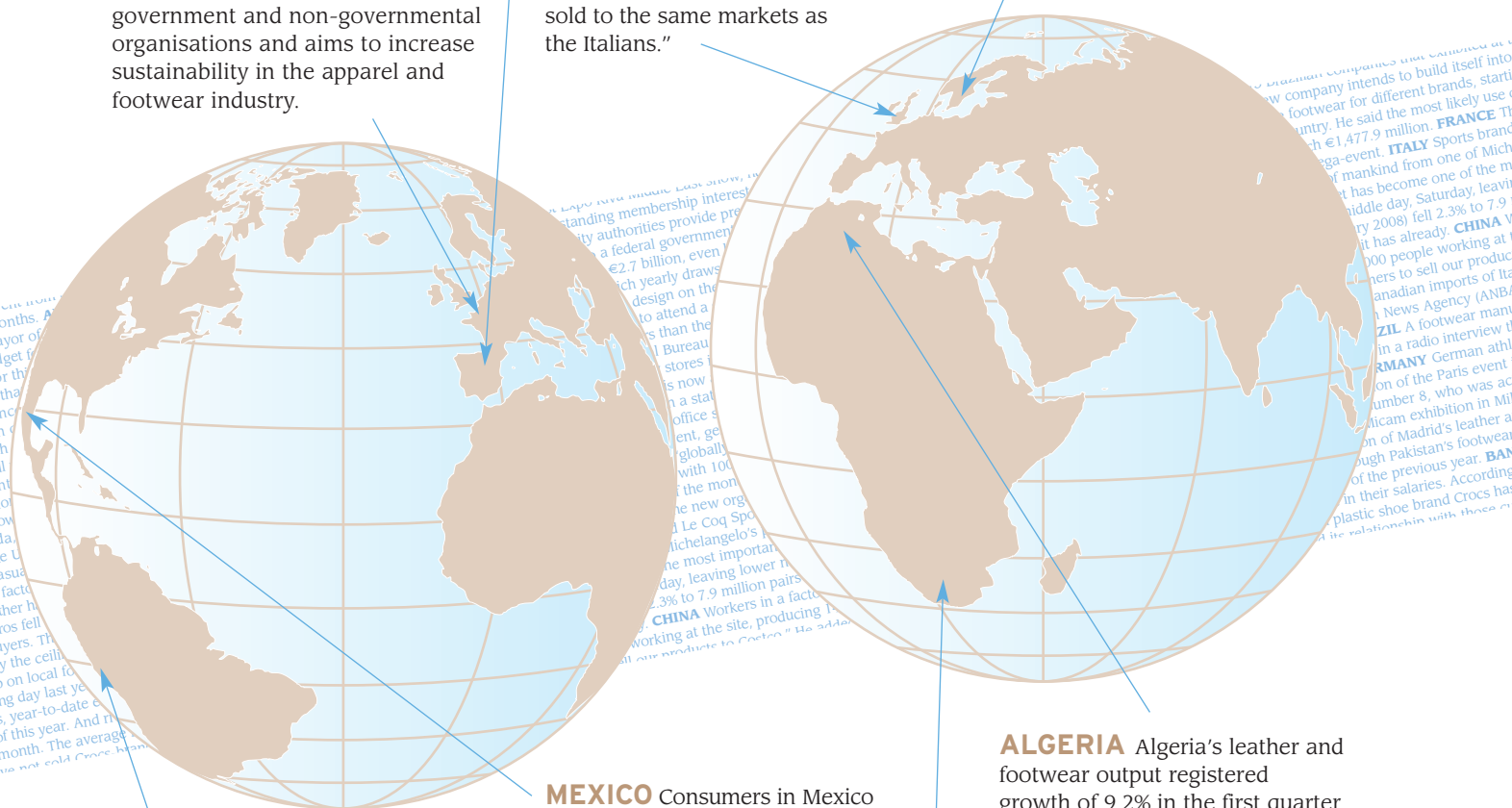
News

SPAIN Brazilian fashion flip-flop brand Havaianas opened a new store in Barcelona on July 9. Covering 120 square-metres, the new outlet is the brand's biggest store to date in Europe. The company's European managing director, Eno Polo, said it was only right for Barcelona to have the biggest Havaianas store in Europe, saying the Catalan city was "like Europe's Rio de Janeiro".

FRANCE Testing agency CTC has been accredited by the Sustainable Apparel Coalition (SAC) to help companies determine the sustainability of their suppliers and factories. SAC is the largest trade organisation of brands, retailers, manufacturers, government and non-governmental organisations and aims to increase sustainability in the apparel and footwear industry.

UK Dr Kerry Senior, head of the UK Leather Federation, believes there is scope for establishing new tanneries in the UK if investors could be found. "The bulk of our bovine raw material goes to Italy, and it makes more sense, to me anyway, for those hides to be processed in the UK and the leather sold to the same markets as the Italians."

SWEDEN New York-based apparel group Authentic Brands (ABG) has acquired Swedish outdoor footwear brand Tretorn from Puma. Other sports brands that ABG owns include Prince, Hind, Viking and Muhammad Ali. ABG said it would place emphasis on helping Tretorn grow its footwear, outerwear and tennis equipment business in North America and Asia.



COLOMBIA More than 20% of manufacturing companies in Colombia are finding it difficult to recruit workers, a survey has revealed. Leather and footwear industry association Acicam said: "Our sector has one of the highest levels of labour cost in Colombia, perhaps even the most expensive. Most young people no longer want to work as technicians, so we have very few coming through and that means the value of those we do have is going up."

MEXICO Consumers in Mexico bought 303 million pairs of shoes in 2014. Mexican manufacturers made 245 million pairs in the course of the year, exporting 27 million of them, while retailers and traders brought 70 million pairs of imported footwear into the country. Retailers' inventories account for the rest of the 303 million.

SOUTH AFRICA Men's footwear manufacturer Hopewell Footwear plans to increase exports from 10% of production to around 50% within three years. The Durban-based company makes 1,500 pairs per day and will aim to boost sales of shoes under its Kingston brand in other African countries.

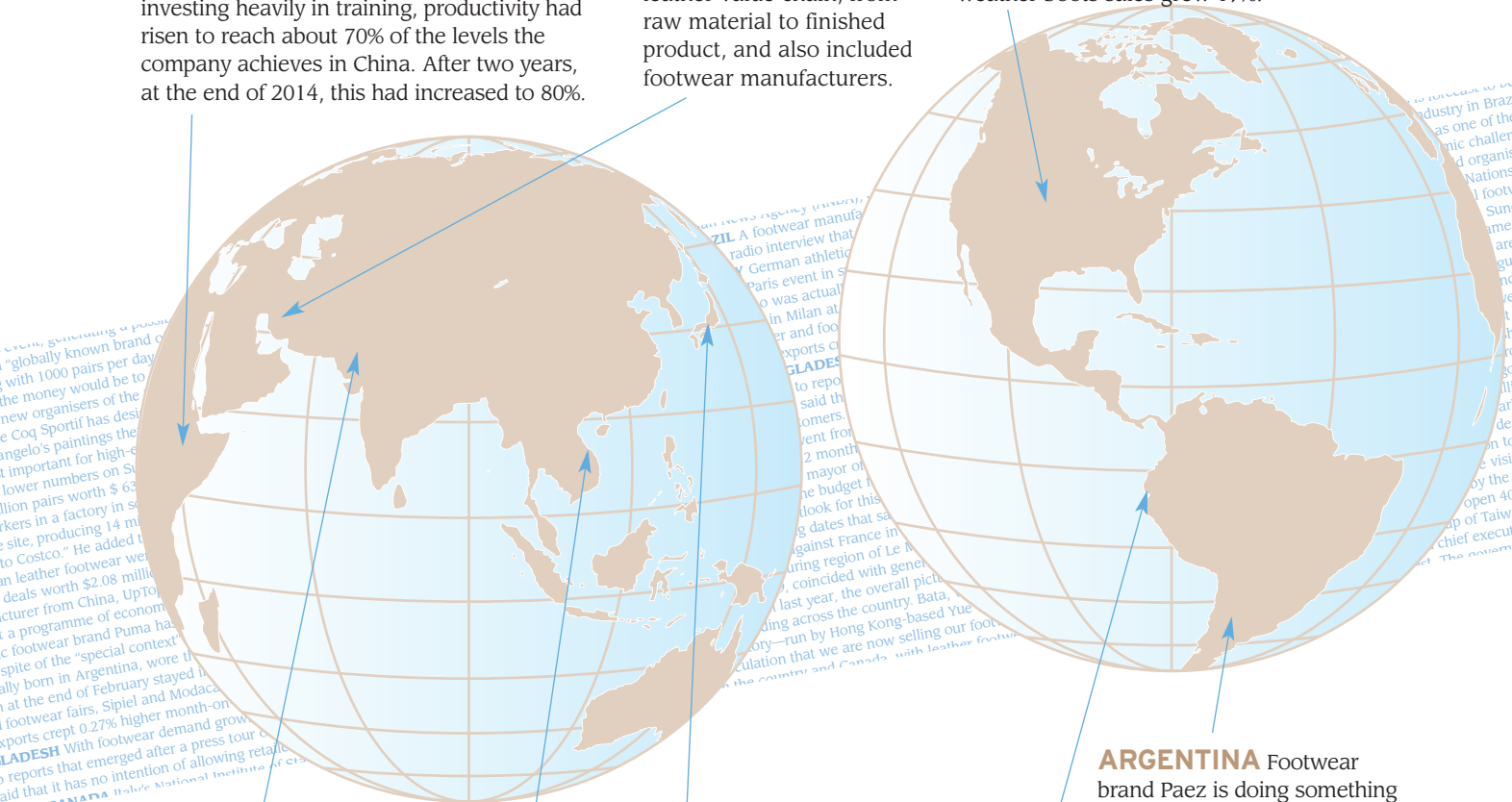
ALGERIA Algeria's leather and footwear output registered growth of 9.2% in the first quarter compared with the same quarter last year. Footwear and leather were among a strong list of sectors to show growth for the three-month period, according to government statistics. Meanwhile, there was a fall of 4.2% in the value of Algeria's oil production.

ETHIOPIA The Common Market for Eastern and Southern Africa has helped the Ethio International Footwear Cluster Cooperative prepare an export plan related to skills, equipment and finance. The coop is aiming to double its daily production capacity to 12,500 pairs.

● Chinese group Huajian will increase its workforce of 4,000 in Ethiopia to 40,000 in the coming years. After one year, after investing heavily in training, productivity had risen to reach about 70% of the levels the company achieves in China. After two years, at the end of 2014, this had increased to 80%.

IRAN The association of leather-sector producers and exporters of the Iranian province of East Azerbaijan hosted the seventeenth International Leather Exhibition in the city of Tabriz at the end of July. Exhibitors represented the whole of the region's leather value chain, from raw material to finished product, and also included footwear manufacturers.

US Outdoor footwear sales in the US grew 17% in volume in the year to the end of June following 1% growth the previous year. The top five brands were Merrell, Keen, Nike, Vasque and Salomon. Sorel and Timberland landed in the top five in the women's and children's markets, respectively. Figures from research group NDP show hiking boots recorded 22% higher value after a flat performance the previous year, while all-weather boots sales grew 17%.



PAKISTAN Pakistan's leather exports fell in value by 6.1% in the financial year that ended in June, dropping to \$1.2 billion, compared with \$1.3 billion in the previous financial year. It exported 13.9 million pairs with a value of \$131.2 million, a decline of 13.4% in volume but up 10.2% in value. The average price was \$9.43.

VIETNAM Official estimates anticipate an increase between now and 2020 of 45% in the amount of leather Vietnamese finished product manufacturers will consume. Vietnam is the fourth largest importer of hides and skins in the world, spending \$1.3 billion on raw material in 2014.

JAPAN 32 Spanish companies flew to Japan to take part in a Shoes From Spain exhibition. Footwear industry federation FICE said it allows Spanish companies to give buyers early sight of their collections and convert this into orders at the European shows. In 2014, Spanish brands exported 2.4 million pairs of shoes to Japan, bringing in revenues of €48 million.

ECUADOR The mayor of Quito, Luis Amoroso, formally opened the third FICCE (an international event showcasing footwear and footwear components) exhibition in the Ecuadorean capital in July. Mr Amoroso paid tribute to footwear manufacturing companies from the province of Ambato and to the tanners who supply them. He said: "Companies from Ambato are our national market leaders, they have professionalism, great designs, great variety and, most importantly of all, access to high-quality raw material."

ARGENTINA Footwear brand Paez is doing something similar for espadrilles to what Havaianas, from Brazil, has done for beach sandals, turning a traditional, inexpensive style of footwear into an internationally desirable fashion item. Paez had a turnover last year of \$9 million employing 90, but its espadrilles are now on sale in 45 countries and it has three own-brand stores in Spain.



Footprints

SPANISH SHOE INDUSTRY LEADER DIES AT 58

Representatives of the footwear industry in Spain have paid tribute to **Juan Ignacio Rivera Escribano**, a founder member of Avecal, the footwear industry association of the Valencia region, who has died at the age of 58 following a serious illness.

Mr Rivera ran Veri 2011, a footwear manufacturing company based in Elda, which produced high-end women's shoes under the Nacho Rivera brand. He had also served as a member of the executive committee of Spain's national footwear industry association, FICE.

ASICS CASTS NET FOR 'CENTRE OF EXCELLENCE'

Asics is setting up a 'global lifestyle division' and hiring managers from inside and outside the industry, "regardless of nationality or location".

Starting in September, the division will lead marketing for Onitsuka Tiger and Asics Tiger, and a Centre of Excellence will be established in Europe.

The division will be headed by **Torsten Widarzik**, CEO of German fashion label Campus, who joins this September.

Mr Widarzik was previously general manager at Levis Strauss in Germany and Switzerland, and brand director of Nike CEMEA.

EXPORT CREDIT LINE FOR COLOMBIAN SHOE FIRMS

Colombia's business minister, **Cecilia Álvarez**, has said the government there will offer a credit line of almost \$70 million to manufacturers in the leather and footwear sector that want to move into export markets.

Ms Álvarez announced the development in Bogotá at Colombia's International Footwear and Leather Show (IFLS). She also said Colombian companies will be able to receive a reduction in tariffs on imported raw materials and machinery if they are able to show that the products they need are unavailable in Colombia.



CHURCH CEO MADE HONORARY FELLOW

The University of Northampton has awarded **Stephen Etheridge**, chief executive of footwear company Church & Co, an honorary fellowship of the university at this year's summer graduation ceremonies.

Shoe production at Northampton-based Church & Co spans centuries, with manufacturing starting in 1675. Although now a wholly owned

subsidiary of Italian luxury group Prada, the company has sought to maintain English shoe traditions and heritage in its manufacturing process. The recent success of the brand has led to the purchase of Northampton's former bus depot to enable expansion of its manufacturing facilities.

Mr Etheridge has a long association with the University of Northampton, offering advice and support to staff on the development of its degree course in footwear and accessories. He has also demonstrated commitment to the wider footwear industry, serving as non-executive director of the British Footwear Association (BFA) for many years and taking up the position of non-executive chairman of testing and research organisation SATRA.

PRISONERS SET UP LEATHERGOODS FACTORY

Twenty-five people detained in a penitentiary in Paraguay have been given the go-ahead by the country's ministry of justice to operate a small leathergoods and footwear factory inside Tacumbú prison in Asunción.

Justice minister **Sheila Abed** formally opened the facility at the start of August, saying it was a welcome part of a wider programme of prisoner rehabilitation. She said offering prisoners the chance to work would help them become part of society again and would also serve to "humanise prisons".

GOVERNMENT ASKS FOR CLEARER LEATHER PRICES

Reports from Argentina say the country's commerce minister, **Augusto Costa**, will hold a meeting among industry bodies representing the footwear, leather and leathergoods industries to try to settle a dispute about the price of leather.

Official figures suggest that the price of hides has fallen by 35% since November 2014 but producers of footwear and other finished products

have complained to the government that the price of finished leather has not kept pace with this drop.

Tanners have said that, even though the price of hides has come down, their overall production costs have not.

TANNERS IN THE MIDDLE OF JIMMY CHOO ROW

Italian tanners are at the centre of a row between luxury accessories designer **Tamara Mellon** and the brand she helped make famous, Jimmy Choo.

Ms Mellon co-founded Jimmy Choo in 1996 and led the company until 2011. In 2013, she launched a new brand in her own name and began offering high-end shoes, boots, bags and other accessories that she says put "the needs of modern women first".

However, Ms Mellon has instructed a London law firm to send a 'cease-and-desist' letter to her previous employer, the Jimmy Choo brand. The letter alleges that a meeting took place recently between Jimmy Choo and leading suppliers, including tanners from Italy. At this meeting, the letter continues, the company's senior vice-president for supply chain, **Stefano Savoldi** is alleged to have made it clear

to the tanners that Jimmy Choo did not want the Tamara Mellon brand to benefit from the network of suppliers that Jimmy Choo works with.

A Jimmy Choo spokesperson said the company would "vigorously contest the complaint".

NEW ASSOCAL PRESIDENT OUTLINES FOOTWEAR'S IMPORTANCE TO EUROPE

The new president of the Italian footwear manufacturers association Assocalzaturifici met European Union Parliament members to discuss trade policies and access to international markets for SMEs.

More than 80% of footwear made in Italy is exported and many companies have weathered the economic crisis thanks to their exports, said **Annarita Pilotti**, who viewed the meeting as an opportunity to give the MEPs a overview of the industry.

She said: "The Italian footwear industry is an important sector, therefore, which needs European policies that ensure our businesses have access to markets, by taking more forceful action during bilateral negotiations with the most important strategic areas such as Mercosur."

LOUBOUTIN'S RED SOLE TRIUMPHS IN COURT

The Court of Justice of the European Union (CJEU) has dismissed a case against Christian Louboutin's European trade mark for its red soles brought by Roland, a manufacturer of musical instruments, which has the red in its own trade mark.

The European Trade Mark application was originally rejected by the trade mark examiner, then accepted by OHIM (the EU's trade mark granting authority), but opposed by three companies, including Roland. All of the oppositions were rejected..

COLOMBIA: ACICAM SLAMS SUB-\$1 SHOES

Leather and footwear industry association Acicam has said a high proportion of shoes coming into Colombia this year have a value of less than \$1 per pair.

Acicam has calculated that 14.1 million pairs of imported shoes entered the Colombian market in the first four

months of this year and that 6 million of these have come in "under market value". "Even more alarmingly, 3.3 million pairs came into Colombia for less than \$1 per pair."

Over the same period, Colombia's shoe production was down by 7.1% year on year.

LEATHER COUNCIL WILL HELP TURKEY HIT \$500 BILLION IN EXPORTS

The president of the Turkish Leather Council, **Erdal Matras**, has said his member companies can help the overall Turkish economy achieve a goal of bringing in export revenues of \$500 billion (across all sectors) by 2023.

The corresponding figure for 2014 was \$157.6 billion.

Mr Matras, who is also managing director of his own brand of men's and women's shoes and accessories, said there are three main reasons why the Turkish leather sector can be confident of growth.

he said the leather industry is more established in Turkey than practically anywhere else in the world, with statutes governing the supply of hides and skins to tanners dating as far back as 1461.

Then he said the companies are "experienced, talented, and technologically advanced". In addition, the country has a young population and strong labour capacity. 🐍



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Products & Services

ASICS UPDATES GEL CUSHIONING FOR 'MOST INNOVATIVE' FOOTWEAR

Asics America has launched what it describes as its "most technically-innovative sports performance footwear", the new GEL-Quantum 360, which uses its patented cushioning.

The shoe was more than five years in the making at the Institute of Sports Science in Kobe, Japan.

Tom Garza, senior director of footwear at Asics America, said: "People love Asics gel technology and tell they want more of it, so we are giving it to them. It is a game-changer in terms of cushioning. You feel it the second you put it on."

HUNTSMAN BUYS MDI PRODUCER IN ITALY

Chemicals group Huntsman Corporation has completed the acquisition of Italian company Tecnoelastomeri, a manufacturer of methylene diphenyl diisocyanate (MDI) based hot-cast elastomer systems and processing machines.

Based in Modena, Tecnoelastomeri achieved sales of approximately \$12 million in 2014. The purchase price was not disclosed.

Huntsman said it was pleased to have seized an opportunity to strengthen its position in polyurethanes.

A BETTER YEAR FOR FOOTWEAR MACHINERY

Sales for Italian machinery for the footwear and leather sector recovered last year, reporting a 10% rise in sales over the previous year to €518 million.

Exports rose 8% and make up 80% of sales, and there were 235 companies in the sector in 2014.

Giovanni Bagini, outgoing president of Italy's tanning machinery manufacturers' association Assomac, said: "2014 was a year full of change and success for Assomac but we must not and cannot stand still. It is crucial to continue riding the changes and show that we can rise to the transformations witnessed on the international front and reinvent ourselves. It is no longer

sufficient to be present on our consolidated strategic markets.

"The key to the future is a focus on young people and company growth; offering our clients an added value that we can guarantee because we have greater experience than our foreign competitors."

ELCHE EXPANSION FOR INDITEX FOOTWEAR GROUP

Reports from Spain say fashion group Inditex is preparing to invest almost €6 million in the development of the logistics centre its footwear manufacturing division, Tempe, runs in Elche.

Inditex, the parent group of fashion retail chain Zara, has said it wants to expand the Tempe site, building new storage space as well as a new office and management suite. In all, the expansion project will cover more than 20,000 square-metres.

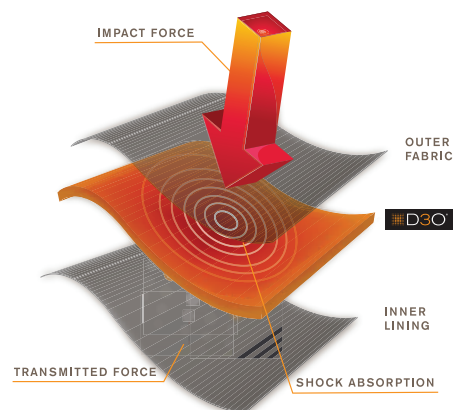
A spokesperson for the local authorities, Patricia Macià, has said the Tempe project is proof that there is a need for extra industrial space in Elche, which is Spain's principal footwear manufacturing hub. She said there were plans in place to construct a whole new industrial park there some time in the next four years.

INESCOP EXAMINES SHOES AND FOOT HEALTH

INESCOP, the Spanish Footwear Technology Institute, hosted an event to discuss foot health at its headquarters in Elda in July.

Alongside the conference, entitled 'Innovation and Advanced Technologies at the Service of the Foot Health: prevention, diagnosis, design, footwear, orthotics and materials', there were workshops on computer-aided footwear design and related tools.

This was part of a wider initiative, SoHealthy, a European research project on healthy feet. It brings together companies from Morocco, Tunisia, Italy, the UK and Spain to research the diabetic foot, the obese foot and the ageing foot - problems that can be prevented or treated with improved



NEW HOME FOR FAST-GROWING D3O

The makers of D3O shock absorbing technology have moved into a new headquarters in Croydon, Greater London, after receiving £13 million in growth capital funding.

The company, which has grown 400% in four years and received the Queen's Award for Enterprise for export, received the funding from new investor Beringea and existing investor Entrepreneur's Fund.

It has enabled the UK company to invest in the new building, a development and testing centre, as well as into the plant and machinery.

D3O was one of the exhibitors at the Desma House Fair last September, after testing its technology on the German firm's footwear machines.

footwear and insoles. The significant growth in the volumes of each of these three groups creates a compelling market opportunity, said the organisers.

ADIDAS BOOST FOR TENNIS

German sportswear group adidas has added Boost technology and expanded TPU capsules to its tennis offering.

It describes a new barricade chassis for the midfoot and heel as "revolutionary", providing stability while offering flexibility and comfort in the forefoot.

Alex Chan, director of adidas Tennis, said: "The Barricade Boost will

introduce new levels of energy return to dynamic tennis movements, giving tennis players the ultimate tool to aid performance.

"Boost technology redefined the footwear industry in 2014. Now we've decided to put it on the tennis court. This shoe offers the best of both worlds – all the features of the Barricade we know and love, with an added Boost."

SAUDI GROUP PUSHES INTO POLYETHYLENE

Chemical group Saudi Basic Industries Corp (SABIC) has formed a new joint-venture operation with South Korean petrochemical manufacturer SK Global Chemical to produce polyethylene products, with footwear one of the likely application markets.

Total investment will be about \$640 million for the technology and plant construction, SABIC said.

The joint venture, which will have its headquarters in Singapore, is expected to operate a series of manufacturing plants, the first of which was recently completed by SK Global Chemical at its complex in Ulsan, South Korea, with an expected annual capacity of 230,000 tonnes. The plants will produce metallocene linear low density polyethylene, polyolefin plastomers and polyolefin elastomers that will meet the growing needs of diverse industries, including footwear.

CHEMICAL MANAGEMENT TOOL POINTS SUPPLIERS IN ZDHC'S DIRECTION

The Zero Discharge of Hazardous Chemicals (ZDHC) Group has unveiled a chemical management system manual that manufacturers can use to align themselves to its goals and which could improve worker safety and reduce environmental impacts.

Available in English and Chinese, the manual "allows an entry point for different roles in the supply chain".

Cheryl Kreindler, ZDHC manager, said: "A sound chemical management system is not only important for worker safety and to reduce environmental impacts on the community and the broader environment, but it is a cornerstone for ensuring continuous improvement and harmonisation towards the ZDHC Group's zero discharge goal."

The framework builds on ISO

management standards, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) Practical Chemical Management Toolkit and the Outdoor Industry Association Chemicals Management Working Group Framework.

The group was launched in 2011 in response to a Greenpeace report, Chemistry in Any Weather. The goal is to achieve zero discharge of hazardous chemicals across supply chains and product life cycles in the production of apparel, footwear and accessory goods by 2020. The group includes adidas, Jack Wolfskin, Li Ning, New Balance, Nike and Puma.

FOOTWEAR TO BECOME INCREASINGLY IMPORTANT TO GROWING SBR MARKET

A new report from US research company Global View says the styrene butadiene rubber (SBR) market will grow steadily to reach a value of more than \$23 billion a year by 2020.

In terms of volume, the report says the market size was just over 5,000 kilotonnes in 2013, but that this will grow by more than 6% per year over the next five years. It also says that, although footwear was a small market segment for SBR producers in 2013, the importance to them of footwear will also grow substantially.

ROGERS REBRANDS ITS FOAMS DIVISION

The high-performance foams division of protective materials manufacturer Rogers Corporation has officially changed its name to Elastomeric Material Solutions. The New England-based company said it believes the name-change better reflects its "growing range of products and capabilities".

Vice-president for the Elastomeric Material Solutions, John Quinn, said the decision was also the result of dialogue with customers and employees around the world. "More than just foams, we are a technology-based material solution provider," he said.

ITALY: RESEARCH INSTITUTE TO ADD FOOTWEAR CAPABILITIES

Tuscany-based leather research centre POTECA has announced that its expansion plans include a footwear assembly line to enable it to offer

greater research capabilities for footwear firms or producers of leather for footwear.

The €945,000 contract for the work was won by construction firm Empoli Luce and should be completed by December.

UK PARTNERS TO LAUNCH INTERNATIONAL CENTRE FOR LEATHER

Northampton's Institute for Creative Leather Technology, the Leather Conservation Centre and the International Museum of Leathercraft are launching an International Centre for Leather.

Positioned as a global Centre of Excellence, the UK-based centre will bring together education, research, development and innovation, conservation and heritage, creative fashion and design.

Rachel Garwood, director of the University of Northampton's Institute for Creative Leather, said: "The close juxtaposing of all the aspects of the supply chain means that each will be enriched by the others, allowing new relationships and creative ideas to be generated. In this way, those activities will be future-proofed."

"The proposed centre will become the world's 'one stop shop' for information, insight and inspiration, making Northamptonshire the most important global source of leather and leather related information."

SALEWA SIGNS UP FOR SOLES FROM MICHELIN

Italian mountain footwear and equipment brand Salewa has agreed to use technology from tyre manufacturer Michelin in the soles of two of the styles in its footwear collection for spring-summer 2016.

Michelin announced a joint-venture with Chinese textile manufacturer Jihua at the end of 2014 to make high-performance soles for the technical footwear market. The two partners said at the time that they believe the footwear market is "hungry for technology".

Two Salewa models, Lite Train and Ultra Train, will use Michelin technology in their soling systems, each using different blends of rubber and combinations of grip systems Michelin already uses in its tyres. 



Backtrack

World Footwear's publishing cycle and limitations on space make it impossible for us to run more than a carefully selected sample of news from across the industry.

However, we publish hundreds more stories on **www.footwearbiz.com**. The site is updated every day with news from every continent and every part of the industry, making footwearbiz.com one of the most

comprehensive archives of news anywhere on the web for the global footwear industry.

We list below just a few of the headlines that have appeared on the site in recent weeks –

www.footwearbiz.com allows you to read those you have missed.

19.08.2015

UGG announces Liverpool opening
Brazilian optimism ahead of Micam

18.08.2015

Adidas employees test workplace concepts

17.08.2015

Yue Yuen's sales rise 5% in July

14.08.2015

Skechers turns focus on Latin America after 'incredible growth'

13.08.2015

Chinese footwear giant on the ascent

12.08.2015

Brazil to set up "mini Inspiramais" at ACLE

Adidas' new strategy leads to 'robust' first-half growth

Descente targets footwear with inov-8 purchase

10.08.2015

Bags and shoes drive better-than-expected growth at Michael Kors

05.08.2015

China: Outdoor industry 'pulls together' as growth slows

Dip for Ugg but Deckers CEO remains confident

Record second quarter for Columbia Sportswear

04.08.2015

800 brands at FFANY

Turkish shoe firm Tanca turns heads overseas

03.08.2015

Pared-back Crocs confident in new strategy

New Hi-Tec shoe aimed at younger customers

30.07.2015

Spanish company Munich to launch new sneakers brand

29.07.2015

85 new exhibitors sign up for Momad

27.07.2015

Puma takes punt on footwear to turn fortunes around

Growth continues for Timberland

24.07.2015

Under Armour: 40% rise in footwear sales for Q2

23.07.2015

New Q2 record for Wolverine Worldwide
Wolverine boosts finances and considers 'possible future acquisitions'

21.07.2015

Cycling brand Shimano expands its footwear range

20.07.15

Double commitment from Ortovox on labour and sustainability

17.07.15

Keen tops category as outdoor industry launches consumer campaign

16.07.15

Vibram names new Canadian distributor

15.07.15

Delcam shares highlights from Footwear Technology Forum

Yue Yuen H1 revenues up by more than 7%

13.07.15

'Positive' signals from Italian leather show

10.07.15

Helping hand for Zambia to develop leather sector

09.07.15

Argentinean footwear brand pushes for global growth

07.07.15

Footwear workers die in factory collapse in China

01.07.15

A strong year for Pentland

30.06.15

Nike reports 'outstanding' 2015

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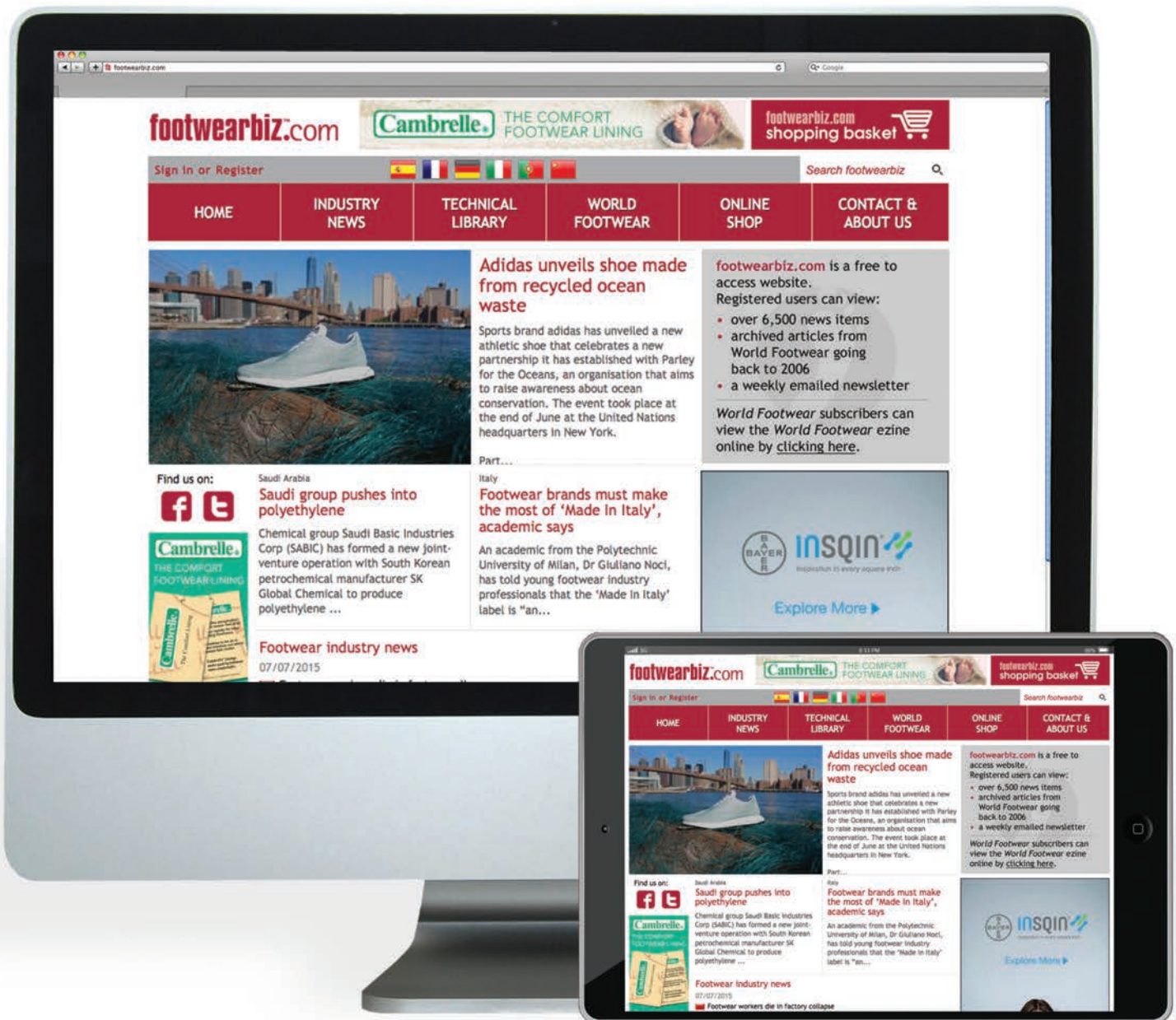
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A change of terrain

A number of UK-based leathersgoods manufacturers are reporting increased interest on the back of the 'Made in Britain' movement, which organisations such as Meet the Manufacturer, EEF and the government are trying to instil through marketing campaigns, advice and networking events.

Mulberry's second Somerset factory is close to full capacity and in its yearly results presentation confirmed its commitment to British manufacturing with the suggestion that to keep its domestically made stock at 50%, it will open new factories in coming years. Although mass manufacturing of leathersgoods, footwear, clothing and textiles looks unlikely to come back to UK shores, there seems to be a resurgence in a demand for artisan skills, with UK consumers willing to pay a premium and overseas buyers favouring the quality. An EEF survey of 241 British businesses concluded that one in six had reshored production in the last three years, with the top reasons being improved quality and minimised logistics costs. But does this apply to footwear?

With UK shoe production growing 22% in the last two years, we consider whether brands would take a reshoring risk to join the Made in Britain movement.

It seems that way, according to the British Footwear Association. "There is a steady and significant increase in international interest in British-made footwear," its CEO, John Saunders, tells us. There are currently 26 companies making shoes in the UK, and although this is a fraction of the number of a few decades ago, many are reporting increased sales. The number of pairs produced has risen from 4.6 million pairs in 2012 to 5.4 million in 2013. Estimates for 2014 suggest there were 5.6 million pairs made – a growth of 22% in two years. Of these, 1.3 million were of the Goodyear-welted variety.

In a recent edition of *World Footwear*, we looked at the Northamptonshire-based leather brands, including Loake and Crockett & Jones – all of which were reporting growth on the back of their export policies. “It’s a very different look to the Italian shoes; the Italians have a huge market but the Made in England look is particularly strong at the moment,” Jonathan Church of the Church’s footwear dynasty, who now co-owns Joseph Cheaney & Sons with his cousin, told us.

However, another Northamptonshire company, NPS Shoes, has a more sober view on the ‘resurgence’. “Made in Britain isn’t growing manufacturing, it’s just stabilising it,” comments managing director Christian Castle. “If we were the same size in 10 years, I think that would be an achievement.”

The company makes around 50,000 pairs for brands including Fred Perry, Jack Wills and Marks & Spencer, as well as its own Solovair label, and one benefit it sees is the convenience factor for British retailers. “The brands like that they don’t have to fly to China or India, it’s the ease of communication, and you can put a collection together more easily than if you were trying to do it long distance.”

But supply chains can be tricky in the UK, with few tanneries and European insole suppliers “more amenable to smaller runs and able to prepare textiles to a footwear standard” than their domestic counterparts.

“The logistics are quite complex.” The company’s next objective is to promote Solovair, “because private label can be a fickle old game. One season it’s fine and then a new buyer will come in and choose to make overseas. You have more control over your destiny with your own brand.”

Halving production costs

Making in the UK comes with associated costs – labour in particular. When CEO David Suddens took over boot brand Dr Martens in 2002, the company was in “a mess”; sales had fallen from £220 million to £130 million with losses of £60



Dr Martens chairman David Suddens says manufacturing methods need to change for mass production in the UK to be viable.

CREDIT: MEET THE MANUFACTURER

million and it was three months away from going bankrupt.

“It seemed fairly obvious that with margins about 20%, that level of loss and the clamour around the world for lower prices, we had to move manufacturing offshore. So I closed half a dozen factories and made 2,000 people redundant,” he says.

It wasn’t an easy decision. “You’re devastating communities, this is what the villages depended on, but it was a question of survival.”

One fear was how consumers would react to the news that Dr Marten’s, a quintessentially English brand, would now be

Joseph Cheaney & Sons have been making shoes in Northampton, England’s most famous shoemaking town, since 1896.

CREDIT: CHEANEY SHOES



Family-owned NPS Shoes sells under its own brand Solovair, and makes for companies such as Jack Wills.

CREDIT: NPS SHOES



made in Asia. "We got grief about it, but not that much and not for that long," he admits, "because fundamentally the consumer wants good value and good prices and was not prepared to pay the premium for UK manufacturing back then."

The cost of making in Asia is less than half that of the UK, which meant the company could lower its prices and improve the financial health of the business. Most shoes are now made in Thailand and Vietnam, but the company kept one factory in England: Wollaston, the site where the first Dr Martens were produced in 1960. Initially its job was to make samples, but this increased to small runs, and as the demand for Made in England globally increased, the factory grew and has recently doubled in size. "Could we say is this the beginning of the wheel coming full circle?" muses Mr Suddens. "I don't think so, actually. From a cost point of view, it still costs twice as much to make in the UK."

He believes one of the reasons the manufacturing base declined in the 1960s – when the UK had more than 20% of the trade in manufactured goods – was the British attitude towards investment. "The northern Italian families and the German Mittelstand (small- and medium-sized enterprises) are obsessed with investment and product improvement, whereas we were not in the UK, and we lost that global trade. We were not making products that people wanted and, as a nation, we were not really orientated towards product excellence, investment and innovation."

Fresh thinking

When the brand reached its 50th year in 2010, Mr Suddens challenged the team to imagine what Klaus Martens, the German doctor who invented the air-cushioned sole, would create if he were alive today. "My point was, I do want to bring manufacturing back to Northamptonshire, but not to the old

cobblers, let's find a way of completely redesigning the boot and shoe and changing the rules of the game. Wheels do go full circle – that's the nature of the beast. But the terrain underneath the wheel will have changed, almost certainly."

He says if nostalgia for Britain's heyday or a misplaced sense of loyalty are the motivations for reshoring, it won't work.

"We all know what that consumer needs: it's a combination of quality, service, value, innovation, and probably mass customisation. Those are the reasons to bring manufacturing back: if you do it because you think it's a nice thing to do, it won't work, because customers want value for money."

Whether or not the terrain has changed, a seed seems to have been planted. The Made in Britain marque was launched in 2011 to support domestic companies and of 500 members, five are footwear manufacturers.

"The footwear industry in the UK feels quite strong – the campaign has received many enquiries from manufacturers wishing to maximise their country-of-origin credentials with our marque," says Made in Britain CEO John Pearce. "Manufacturing costs are considerably lower in Asia, and other countries such as Italy benefit from heritage in this sector, but there is a high demand for British-made goods in the UK at home and globally."

Mr Sudden's vision helped Dr Martens grow and catch the attention of private equity firm Permira, which bought the company last year for £360 million.

"When we come back to the UK, will it be with 3D printing?" considers Mr Suddens. "Not in the next five years, but maybe very suddenly we might have the technology to enable mass personalisation, because Made in the UK should be about mass customisation, as well as other things. It takes decades for industrial policy to change, for the seismic shifts to happen. And then when it does, it happens really quite quickly." 

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The Dian Marsella work shoe, the product that featured in a successful pilot test of the new Inescop carbon footprint software tool.

CREDIT: DIAN

A software tool developed by Spanish footwear research organisation Inescop has won certification for its ability to help footwear firms calculate the carbon footprint of their shoes. One manufacturer, Alicante-based work and safety shoe producer Dian, has already tried the tool out successfully.

New carbon footprint tool works on shoes

Inescop, the Spanish footwear technology institute, has helped to develop a software tool for calculating the carbon footprint of footwear, taking into account the whole lifecycle of the shoe, from raw material to post-consumer-use disposal. It says the tool, which can generate carbon footprint data in the form of an Excel file, has been designed to help footwear companies improve their environmental performance and that it can also be used as a marketing tool, potentially boosting a shoe producer's credentials in the market by offering proof that it has built environmental responsibility into its designs.

Technology centres from Poland, Portugal and Italy, the

European Footwear Confederation (CEC) and Spanish footwear industry body FICE also contributed to the project, which was partially funded by the European Union. INESCOP used the standard ISO/TS 14067:2013 and the European Union's 'leather footwear' product category rule (PCR) as reference documents to develop the carbon footprint tool.

Hot spots

"The tool will allow footwear manufacturers to find out the volumes of CO₂-equivalent greenhouse gases that are emitted as a consequence of their shoe production,"

explains Inescop director, César Orgilés. "It will help companies identify where the hot-spots are in their set-up and see which materials and which production stages have the greatest environmental impact."

Successful pilot

Spanish standards body Aenor has already validated the tool, largely basing its assessment on the results of a pilot exercise that Inescop carried out with Alicante-based workwear and safety footwear manufacturer Dian. Specialising in shoes for people in the healthcare and catering industries, Dian prides itself on prioritising the foot health and wellbeing of workers. A typical product, the Pisa-Corraea, is a clog-sandal mounted on straight-shape last with rounded toe with an upper in white, blue or black bovine leather. It has perforated padding on the instep to prevent chafing, leather lining and a wedge-shaped sole in polyurethane and TPU (a combination that Dian insists increases the "non-slip efficiency" of the clog).

For its part, the Marsella is a non-slip shoe with special grooves in the sole to make it especially effective in wet conditions. The company says this shoe is especially light and comfortable and, thanks to a microfibre upper, is machine washable at temperatures up to 40°C. It was the Marsella that featured in the pilot study, with Dian receiving formal certification from Aenor for the product, with the documentation stating the standards body certifies that the manufacturer has calculated effectively the carbon footprint of the shoes, in keeping with ISO standard 14067, which specifies the requirements for quantifying the carbon footprint of a product and communicating it to consumers.

Less complex

The obvious question that flows from this is: what is the carbon footprint of a pair of Marsella work shoes? Sadly, as this issue of *World Footwear* goes to press, Aenor has still not released a figure. Inescop has said it will publish the information as soon as it can and that it wants to raise as widely as possible awareness that the tool works and that other footwear manufacturers will be able to use it as effectively as Dian.

The announcement from Inescop comes a few months after membrane technology developer WL Gore said it had carried out a lifecycle analysis (LCA) study on a pair of hiking boots that a partner company had made (*World Footwear* November-December 2014). The carbon footprint of the boots was just one part of a complex calculation that examines a long list of contributing factors, but it did work out the CO₂ equivalent of the boots at 27.1 kilos over a lifespan of three-and-a-half years. Upstream processes (which is what Inescop, Aenor and Dian have concentrated on) contributed 77.2% of the total, which equates to 20.9 kilos of CO₂ equivalent and the materials used to make the boot account for 13.7 kilos of this.

No excuses

The hiking boots in question are substantially bigger than the Dian Marsella and, therefore, use more material, but it will be interesting to see if the figure Dian publishes for the carbon footprint of its product in the end is in keeping with what the WL Gore study found. If it is, footwear companies



Inescop's Miguel Ángel Martínez (left) receives certification for the carbon footprint tool from Gonzalo Piédrola, operations director of standards body Aenor.

ALL OTHER CREDITS: INESCOP



Inescop environment technician Alberto Zapatero (right) with Aenor auditors.



Inescop director, César Orgilés (left), with the chief executive of footwear brand Dian, Joaquín Mataix.

will know that they can work out the carbon footprint of their shoes without undergoing a complex LCA study. It will mean the Inescop tool will do the work for them. This will give them scant excuse for not sharing product carbon footprint information with consumers. 🧐

When a Friends of the Earth report claimed to have worked out the environmental footprint of a pair of leather boots, it was obvious to us there were glaring errors. A leather expert agrees the figures are 'ridiculous' and looks to add some clarity.

UK Leather Federation challenges boot claims

Definitive figures from the UK Leather Federation raise hard-hitting questions about the references to leather in a report widely published by campaign group Friends of the Earth.

Entitled 'Mind Your Step', the report sets out to highlight the environmental impact of seven consumer products, one of which is a pair of leather boots. Focusing specifically on the amount of land and the volume of water required to generate raw materials and make the finished product, it claims that the boots, made from an estimated 0.46 square-metres of leather from Brazil, would have a footprint of 50 square-metres of land and of 14,500 litres of water.

According to calculations from the UK Leather Federation, a calculation for land use of 45 square-metres would be more accurate in terms of cattle distribution, but in a statement submitted to *World Footwear*, the organisation said the Friends of the Earth figure "lacks context". The director of the UK Leather Federation, Dr Kerry Senior, added: "The land isn't being used to support the leather industry, but to rear cattle for meat. The hide remains a by-product."

The figure Mind Your Step gives for water, 14,500 litres to produce 0.46 square-metres of leather, is grossly inaccurate. Dr Senior told us that a figure of 59.8 litres would be in keeping with what the leather industry accepts as an average in the European Union, although he pointed out that many tanneries operate at much higher levels of efficiency in water use, some achieving figures that are half the average.

In the statement, he said Friends of the Earth's figure is "ridiculous" and explained that the vast majority of the 14,500 litres the campaign has included in its calculation is green water, that is, water from rain or snow.

"This is available only to plants," Dr Senior said, "would not recharge aquifers or rivers and will fall regardless of what is happening in the field it falls on. Adding this to the calculation is a way of pumping up the number."

He also said it is worth noting that green water will not be included in the calculation the European Commission has agreed to use to work out the environmental footprint of leather in its ongoing 'green product' project.

Dr Senior went on to say that, if anything, Mind Your Step may underestimate the amount of blue water (from freshwater sources) used in production in the tannery. The



CREDIT: MESSE DÜSSELDORF

report puts this at just over 20 litres for the 0.46 square-metres of leather required to make the boots, whereas the UK Leather Federation director said all of his calculation of 59.8 litres would refer to the blue water tanneries have to consume.

In addition, he said the report's insistence on including higher numbers for leather produced in tanneries that do not treat wastewater effectively (acknowledging that it cannot level this criticism at the Brazilian leather in its own study) was "misleading". He also took exception to statements in *Mind Your Step* that claim leather production is "a determining factor" in beef farming and the allegation that chromium III is toxic.

"Leather is by-product of a renewable resource that is in demand by 90% of the global population," he concluded, "and tanneries are bound by environmental legislation the same as any other industry in any given region."

What can be done?

Many in the leather sector feel an anti-leather agenda began many years ago, and its momentum shows no sign of easing. Examples are easily found on the internet where inaccurate information is stated as fact. It is often unclear what the real objective of this material is, although some is clearly in support of a vegan anti-meat agenda wrapped up in animal rights and welfare. These beliefs should be as respected as any other belief, but opinions set down as hard statements should be balanced and supported by facts – not just selected pieces of information taken out of context, or material that is simply untrue.

There is a need for a better understanding of the industry by those individuals who influence purchases and selection of materials. This is not only in regard to the aesthetic requirements and physical properties of the leather and costings, but an awareness and regard for the corporate social responsibilities of a source of supply. So, what is to be done?

The publisher of *World Footwear*, through sister title *World Leather*, launched an initiative entitled "Nothing to hide", a series of articles by world-renowned academics and experts that aims to counter some of the misinformation with facts on the industry. After initial publication, all these essays are carried on the dedicated website, www.nothing-to-hide.org, and are freely available to any organisation or individual as a true overview of a responsible industry. 

'The land isn't being used to support the leather industry, but to rear cattle for meat. The hide remains a by-product,' says UK Leather Federation's Dr Kerry Senior.

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Why don't soling materials die?

STEVE LEE

For many thousands of year's leather remained the main soling material for all types of footwear with, in certain places, wood, reeds, papyrus, sisal and other natural products also being used. This situation continued until the development of reliable rubber soles in the 1930s. It had initially begun some years earlier with the use of soles cut from sheets of natural crepe rubber, a material formed from natural latex tapped from rubber trees and lightly smoked to improve its properties. Except for having low levels of resistance to oil and solvents, these natural rubber soles were both durable and flexible.

Experiments to improve the properties of natural rubber had been ongoing since the very earliest efforts in the late 18th century to improve them by vulcanisation, but it was only in the late 19th century that serious progress was made. It took even more effort in the 20th century and the introduction of synthetic rubber based

on styrene-butadiene (SBR) in the late 1930s before consistent high quality vulcanised rubber soles could be produced in large volumes. For instance, the first reproducible Vibram SBR units were launched onto the market in 1937 and were made possible by a blend of developments in chemistry, machinery and moulds.

Latex from the Hevea tree was used to produce rubber and provide the first truly viable alternative to leather for footwear soling. CREDIT: SHUTTERSTOCK

After this, the only change for several decades was the introduction of resin rubber sheeting, which is in fact a harder version of standard vulcanised rubber compounds. It was the huge increase in growth of oil-based polymeric compounds through the 1960s and 70s that led to an explosion of new soling materials during this

Table 1 – Introduction of primary soling materials.

1930	1940	1950	1960	1970	1980	1990	2000	2010
L	L	L	L	L	L	L	L	L
NR	N	N	N	N	N	N	N	N
VR	VR	VR	VR	VR	VR	VR	VR	VR
	RR	RR	RR	RR	RR	RR	RR	RR
			PVC	PVC	PVC	PVC	PVC	PVC
				PU	PU	PU	PU	PU
				TPR	TPR	TPR	TPR	TPR
				TPU	TPU	TPU	TPU	TPU
					EVA	EVA	EVA	EVA
						LR	LR	LR
							POE	POE
								?

period. As *Table 1* shows, four new major materials were introduced: PVC, PU, TPR and TPU. Since then, the rate of introduction has slowed to only one new material per decade and none at all in the 2010s. However, the major chemical companies are working on new polymeric materials and, although it is expected that new additions to this list of soling compounds will arrive in the next five years, none have so far successfully come to market to any significant degree.

Table 2 provides a brief description of the major properties and uses of these eleven soling materials and is included in order to try and explain why they all still maintain a position in the soling market. What is most interesting, is why none of these materials have disappeared from the market as new ones have been introduced.

The information in *Table 2* shows quite clearly that there are very large differences between the various soling materials and this is one of the reasons why they all still continue to be used. It is not the dominant reason however. *Table 3* shows the growth of the world's population, footwear production and overall soling market for the years 1960 to 2010, together with a breakdown into the individual eleven soling compounds.

It is quite clear that the increase in demand has been enormous, with a growth of 28% in world population from 1995 to 2015 but an eye watering one of 78% for footwear and soling materials. One of the answers to the question posed in the title of this article, is therefore quite simply that there is too great an increase in demand for any of them to disappear and in conjunction with their differences in properties, all find a market in the broad spectrum of footwear that now abounds around the world. Another factor is that, unlike the situation decades ago when a particular fashion would sweep through the footwear market, all styles continue to be in production all of the time. There are no on-off seasons so every material has a use.

These eleven primary soling materials are also often used in combination so there are in fact many more soling solutions available to the shoe designer/manufacturer. Some of the more common combinations are, VR/VR, VR/EVA, VR/PU, PU/PU, TPU/PU, TPU/TPU, PVC/PVC,

Table 2 – Properties of soling materials.

Material	Properties
L	The original natural soling material and still in use. Comes in the form of skins, so soles can be cut out and trimmed to shape. Leather has poor wear properties compared to many of the other soling compounds but has the best 'natural' image of all.
NR	A natural material based on latex obtained from Hevea rubber trees and normally sold in sheet form as 'Plantation Crepe'. Poor properties as supplied with very little resistance to solvents and oils. Also used at low levels in conjunction with SBR to make VR and at high levels to produce LR. Forms the basis of the natural concept for rubber.
VR-SBR	A tough, hard wearing product with a natural image even though mainly synthetic. Supplied as preformed blanks partially vulcanised so some storage problems. Needs high heat to complete the final vulcanisation step.
RR	A variant of VR which has a high hardness and a particular 'boardy' feel obtained by high loadings of fillers. Sold as sheets, often profiled, to make thin soles for women's court and thin-soled casual shoes.
PVC	A definite down market 'plastic' image but low cost and easy processing. Properties drop off rapidly as density is reduced. Has dominant share in some markets due mainly to price.
PU	Offers broadest range of end effects but is seen as difficult to use due to its chemistry. PU is able to provide the broadest range of densities and hardnesses of all the soling materials. A tough high performance material only surpassed by TPU but needs special machinery to process it and waste is not recyclable.
TPR-SBS	Known for its high tactility, there can however be problems with solvent/oil resistance and bonding. Low density products not very successful so far due to poor properties. Has a strong association with natural products due to the inclusion of rubber in the name and is the only thermoplastic to have this image.
TPU	High performance material mainly used for downhill ski boot shells, soccer boot plates and top-pieces for women's court shoes. Now beginning to penetrate the outsole market and has been blown successfully to 0.6 g/ml whilst retaining good properties.
EVA	Major feature is ability to be blown to very low densities whilst still maintaining reasonable properties. Used in a wide range of applications including midsoles for sports shoes and hard wearing outsoles for casual shoes and sandals, etc.
LR	Key feature is softness and high tactility. Developed as a vulcanised rubber answer to TR. Some problems with foot stability at low hardness with low tear strength and resistance to solvents in adhesives and finishes.
POE	By adjusting the production process it is possible to create a polyethylene with elastomeric properties instead of the normal plastic handle and feel of conventional polyethylene. There is now a range of POEs from different suppliers that should fit into the soling market. They have struggled to find a niche due to problems of bonding and colouring the compounds. They are commonly used in conjunction with EVA for midsoles.

Table 3 – Major soling materials 1960–2010.

		1960	1970	1980	1990	2000	2010
World population	(Millions)	5,701	6,065	6,477	6,891	7,30	7698
Footwear production	(Million Pairs)	13,438	15,565	19,466	21,566	23,941	27,283
Footwear soling	(Ktonnes)	6,484	7,484	9,411	10,395	11,500	13,085
L	"	453	495	584	622	701	797
NR	"	309	352	423	453	482	549
VR-SBR	"	1,576	1,780	2,216	2,405	2,637	2,990
RR	"	298	326	370	406	443	503
PVC	"	1,652	1,948	2,538	2,793	3,059	3,464
PU	"	260	408	542	636	711	821
TPR	"	961	1,072	1,326	1,479	1,665	1,898
TPU	"	89	98	128	167	200	225
EVA	"	553	625	787	889	1,000	1,147
LR	"	259	283	350	368	402	462
POE	"	1	7	17	37	51	58
Other	"	73	90	130	140	149	171
Total	"	6,484	7,484	9,411	10,395	11,500	13,085

Table 4 – Segment definitions.

Sports	One piece	Downhill ski boot shells, roller-blade boots, ice hockey boots, sailing or wind surfing shoes. Except for the last item, generally made from high hardnesses grades of materials such as TPU and TPR.
Sports	Plated	Hard outer soles for soccer boots, rugby boots, baseball shoes, running track shoes, golf shoes. Generally made from two or three components using high hardness grades of TPU or Hytrel.
Sports	Running/ aerobic	General running shoes, aerobic shoes, cross training shoes. Often referred to as white shoes but can be made in a variety of constructions and colours.
Boots	Work/ walking	Robust styles of boot with strong functional elements but also includes secondary use for casual/fashion wear. Covers safety footwear as well as walking.
Boots	Fashion	Consciously designed to meet fashion needs, far less functional than other two areas. Knee high and ankle boots with a wide range of upper materials. Currently also thick soled styles.
Boots	Wellingtons	Footwear with sole and upper (part or all) produced from soling materials. Covers wellington boots, snow galoshes and sailing boots.
Casual	Ath/leisure	Casual footwear designed along the same lines as sports footwear and including 'brown' shoes. Multi-functional styles that can be worn in a range of environments. More fashion orientated.
Casual	Business/everyday	Casual footwear specifically designed for outdoor country use including walking, hiking, etc. Has to have a higher degree of functionality than ath/leisure or everyday. Tend to have a rugged look.
Casual	Fashion	Casual styles that can be worn in an everyday situation but with a high fashion content which recently has generally meant thicker soles. Often based on the design concepts of sports shoes but heavily modified.
Formal	Business	Very formal styles to be worn in a strict business environment normally with suits (men and women) usually black or dark brown and thin soled.
Formal	Court	Women's medium to high heeled shoes with thin soles, usually leather, resin rubber, TPR or TPU and with TPU top pieces on the heels.
Formal	Leisure	Formal end of casual/formal area involving shoes that are a variant on the business shoe for the more formally minded to wear in a casual situation.
Sandals	Beach	Includes all low cost sandals from flip-flops to thongs and other simple styles normally built up on a basic sole unit. In developed markets almost seen as disposable items but can be basic footwear in under-developed countries.
Sandals	Fashion	Mainly women's ranges and well known from the multiplicity of Italian designs which have been copied all over the world. Known as chappals in India. Simple unit sole often with open thonged upper.
Sandals	Leisure	More robust styles for both men and women including sports sandals, casual-sandals, Jesus-sandals, etc. Sole is more functional and needs to be better quality.
House	Casual	Lightweight style of shoe, often a moccasin, to be worn indoors but also stand some outdoor use. More formal and stylish than a slipper.
House	Slippers	Predominantly for indoor use so sole has only a light functionality and uppers are designed more for comfort than style.
Economic	Basic	Artisanal shoes made by local cobblers who use whatever soling materials are available. So VR includes old car tyres for instance.
Economic	Thongs	Same principle as thonged sandals but having more functionality built in as a primary basic type of footwear and so need to last.

Table 5 – Properties.

Test	Units
Sole substance	(mm)
Weight	(grams)
Volume	(ml)
Moulded density	(g/ml)
Hardness	(Shore A)
Tensile strength	(Mpa)
Elongation	(%)
Tear die C	(kN/m)
Split tear	(kN/m)
Stitch tear	(kN/m)
Abrasion resistance	(mm ³)
Adhesion	(N/mm)
Low temp. flexibility	1-5
Wear durability	1-5
Slip resistance	1-5
Ozone resistance	1-5
UV resistance	1-5
Chemical resistance	1-5
Tactility	1-5
Flexibility	1-5
Smell	1-5
Processability	1-5
Design freedom	1-5

TPR/TPR. In addition, the different materials can be used as inserts or logos in conjunction with other materials. *Table 4* provides a brief definition of one way of looking at the seven major and nineteen minor segments that can be used to divide up the footwear market.

That this is only a relatively coarse segmentation of the footwear market is shown by the fact that it is possible to list over 100 different sports, each of which has a special type of footwear produced for them. So 100 variations is forced into just three sub-segments. A similar range of specialisations could be drawn up for the other segments and sub-segments.

How do shoe makers therefore decide which soling material to use? One way is to look at the overall spectrum of properties for the different soling materials and then carry out a Perception Analysis to see which of the materials gives the best fit to the requirements for a particular design of sole. The range of properties to consider are given in *Tables 5 & 6* and show a segment of a such an analysis. *Table 5* suggests that any choice is complicated

Table 6 – Perception analysis (sports running/aerobic).

						TPR-SBS			PVC			TPU			PU		
Variable Items				Top 5	Ideal	Act	% Fit	Wa	Act	% Fit	Wa	Act	% Fit	Wa	Act	PU	Wa
	Units	Method		Weight	Data	Yes			Yes			Yes			Yes	% Fit	
Moulded Density	(g/ml)	DIN 53420				1.00			1.20			0.80			0.50		
Weight	(grams)		Max	0.30	550	850	65	0.19	1,020	54	0.16	680	81	0.24	425	129	0.39
Hardness	(Shore A)	DIN 53505	Min		60	60	100	0.00	60	100	0.00	60	100	0.00	60	100	0.00
Tensile	(Mpa)	DIN 53504	Min		6	6	100	0.00	10	167	0.00	12	200	0.00	7	117	0.00
Elongation	(%)	DIN 53504	Min		400	650	163	0.00	410	103	0.00	850	213	0.00	450	113	0.00
Tear Die C	(kN/m)	DIN 53515	Min	0.15	15	30	200	0.30	35	233	0.35	45	300	0.45	12	80	0.12
Tear Split	(kN/m)	DIN 53507	Min		5		0	0.00		0	0.00	8	160	0.00	5.5	110	0.00
Tear Stitch	(kN/m)	DIN	Min		15	15	100	0.00	18	120	0.00	18	120	0.00	15	100	0.00
Abrasion	(mm³)	DIN 53516	Max		200	180	111	0.00	210	95	0.00	55	364	0.00	170	118	0.00
Adhesion	(N/mm)	DIN	Min		5.0	5.5	110	0.00	5.5	110	0.00	10.0	200	0.00	8.0	160	0.00
Low Temp Flexib		Gehman	Min		-10	-40	400	0.00	-15	150	0.00	-25	250	0.00	-20	200	0.00
Wear Durability	1-5	SATRA		0.25	3	2.5	83	0.21	1.5	50	0.13	4	133	0.33	3.5	117	0.29
Slip Resistance	1-5	SATRA			4	3.5	88	0.00	3	75	0.00	3	75	0.00	3	75	0.00
Ozone Resist	1-5				2	2	100	0.00	3	150	0.00	4	200	0.00	4	200	0.00
UV Resist	1-5				2	2	100	0.00	3	150	0.00	3.5	175	0.00	3.5	175	0.00
Chemical Resist	1-5				2	2	100	0.00	4	200	0.00	3	150	0.00	2.5	125	0.00
Tactility	1-5				4	5	125	0.19	2	50	0.00	3	75	0.00	3	75	0.00
Flexibility	1-5			0.15	4	5	125	0.00	4	100	0.15	4.5	113	0.17	5	125	0.19
Smell	1-5				3	2	67	0.00	3	100	0.00	3	100	0.00	2.5	83	0.00
Processability	1-5				4	4	100	0.00	5	125	0.00	3	75	0.00	3	75	0.00
Design Freedom	1-5			0.15	4	4.5	113	0.17	4	100	0.15	4.5	113	0.17	3.5	88	0.13
Average Percentage Match				1.00			124	1.06		117	0.94		160	1.36		118	1.12

*NOTE: For each sub-segment in Table 5, property factors are selected and given a weighted percentage significance which is used to calculate the WA (weighted average). This is then compared to the % Fit (percentage of ideal) which takes all the properties into account. A comparison can then be made for all the different soling materials and, for each sub-segment, of the percentage of ideal and weighted average values to get an idea of how the different materials compare to each other.

and that over 20 different factors need to be considered before reaching a decision. The properties showing (1-5) are a ranking scheme where 1 is normally a low fit and 5 a high one. Table 6 shows it is possible to highlight five key factors to simplify the analysis.

These properties don't really change very much over time and only need to be looked at again if any new compounds are developed. What does change quite frequently and dramatically is the price structure of all the different soling materials. At the end of the day, therefore, the choice of soling compound to use for a particular application needs to consider the best fit of properties but, more importantly, the overall cost.

The latter depends not only on the price of the soling compounds but also on the cost of producing the units. So for a particular casual shoe design it might be possible to find off-shelf black units produced from VR, TPR, PVC, PU

or blown TPU. If all five soles meet the necessary physical property requirements then the final decision will inevitably come down to price. Therefore the dominant reason that soling materials don't die is cost, as all

the materials come into their own at different times of the design/production cycle over many seasons. There is a position for all existing ones as well as for any new ones than can be developed in the future. 🔄



The Vibram 'Carrarmato' introduced in the late 1930s was the first moulded unit sole and began the revolution in soling systems that has continued ever since and is still in production. CREDIT: VIBRAM



STRATASYS Objet50 CX2 printer.

CREDIT: STRATASYS

3D printing at work

SERGIO DULIO

In the earlier article, we mainly focused on state of the art in 3D printing or, to give it its better title, additive manufacturing (AM). It is a tricky subject because technologies in this field are developing rapidly and, in the past twelve months, there have been interesting evolutions that once more testify how vibrant and dynamic this sector is and how interest is growing concerning their applications. Although this second article is focused more on practical examples, it is worth at least mentioning two relevant elements that characterise these recent evolutions.

Those who have an interest or are driven by mere curiosity, will certainly be aware of the overwhelming proliferation of new models of printers, especially in the lowest cost range with literally hundreds of vendors and systems appearing priced between \$750 and \$5,000, which makes them suitable as true personal 3D printers. This is the result of the expiry of the first patents on

The July/August 2014 issue of *World Footwear* contained details of the latest advances in 3D printing. This further article features case histories of applications supported by numerical evidence and practical data on its applicability in footwear manufacturing.

some of the initial AM technologies. Established companies and start-ups have had access to the original patent contents and can build their machines on those principles, contributing to the widespread diffusion of the technologies and to a progressive democratisation of their adoption.

This has been accompanied by intensive research on materials that is expanding the range of applications and the amount of objects that can be 3D printed at an incredible pace. Variety and material properties are certainly important as was clearly stated in the earlier article. However,

another aspect of AM continues to hinder its adoption relative to more traditional techniques—the low accretion speed of objects being manufactured that results in processing times that are normally counted in (several) hours. That is why, at the recent Materialise World Conference held in Brussels at the end of April, some announcements on recent achievements to accelerate processing speeds were broadly welcomed by the more than one thousand participants present.

Two in particular are worth a mention: the CLIP system from

Carbon3D and the Multijet Fusion approach from Hewlett Packard. Both claim astounding reductions in printing time. HP stated in a recent presentation that its MultJet technology is ten times faster than any other on the market (an object once requiring ten hours processing time can now be made in approximately one), combined with unprecedented versatility in terms of usable materials. Carbon3D goes even further, stating that its technology is 25 to 100 times faster. A benchmark component shown on their website takes almost 3.5 hours to build using laser sintering, while the CLIP machine only needs 6.5 minutes. While it may sound—and probably is—a little too optimistic, it nevertheless gives a clear indication of where the struggle now lies; reducing the processing time to a level that can make 3D printing competitive with other manufacturing approaches and the final cost of the items produced.

These introductory remarks are necessary in order to understand how rapidly things are changing, even in the relatively short time frame of one year. While all this sounds interesting and exciting, there is a more fundamental question that we still have to answer: can 3D printing really work in the world of shoemaking? Can it be applied to replace or complement current manufacturing techniques and how will these technologies affect future products? These are the topics covered in this article and, in order to give exhaustive and comprehensible answers, a few benchmark objects well known in terms of traditional manufacturing have been selected that were all tested and produced with different kinds of AM machines. This work is part of an exploration being conducted by ATOMLab (*World Footwear* July/August 2015) in collaboration with STRATASYS (3D printing and AM systems) and Energy Group, an Italian vendor of STRATASYS machines and a service provider in the 3D printing domain.

BENCHMARK CASES

The items considered were a footbed, an unit sole and an injection mould, each of them being fairly representative of a whole category.

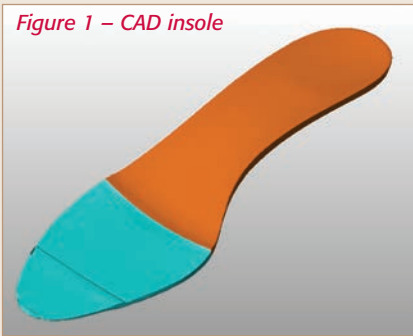
Footbed (Figure 1) – one of the structural

Results

Input – Footbed (Figure 1)	
Requirements	The object is made in two parts, given as two separate CAD models for the front and the rear. The front must be soft and flexible and the rear rigid. There must be no assembly operations and the object should naturally combine the two parts.
Materials	Any rigid material for the back, any soft material for the front.
Finish	Low quality (invisible part).
Accuracy	High, especially in the back part.

Output - Footbed (Figure 5)	
Machine	STRATASYS Connex 1 260.
Materials	ENDUR (rigid), Tango Black Plus (soft), support material.
Amounts used	ENDUR 138 grams, Tango Black 37grm, support material 131grm.
Process time	4 hours and 31 minutes.
Cost	€7.50 (including support material, wasted in the process).

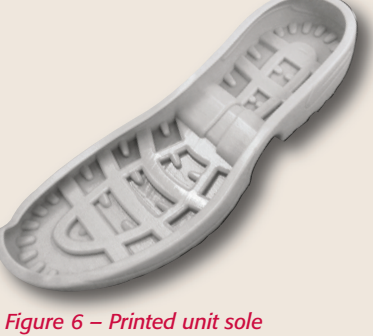
**Delivered part looks accurate and with a good finish. Rigid part is certainly adequate while the front is too soft compared to the materials normally used, indicating that a much more rigid material should have been chosen. The two parts are directly bonded in the printing process and do not need any further assembly.*



Input – Unit sole (Figure 2)	
Requirements	The CAD files represent a model of a trekking boot sole normally made in rigid, high resistance TPU. It must be produced as a totally finished object (no vacuum casting or other rapid tooling approaches).
Materials	High compactness materials, similar hardness and rigidity of TPU.
Finish	High quality, similar to the one obtained in moulding.
Accuracy	High.

Output - Unit Sole (Figure 6)	
Machine	STRATASYS Object 30 Prime.
Materials	Tango Grey.
Amount used	Build material 338grm, support material 504grm.
Process time	20 hours, 36 minutes.
Cost	€165.00 (including support material waste).

**The object was actually produced in two variants; the first in a very strong material (RGD525) that was too rigid to be compared with the behaviour of a TPU-like sole. In the second version, TANGO Grey was used that was, on the other hand, extremely flexible to resemble the properties of a thermoplastic sole.*



components that make up the shoe and contribute to its structural integrity and mechanical resistance in the same way as the counter or toepuff. Invisible parts which do not have stringent aesthetic requirements, do not need a high level of finishing and do not demand extremely high dimensional accuracy.

The reason why a footbed was chosen instead of a counter or a toepuff lies in its higher manufacturing complexity. While the other two are simply cut and shaped, a footbed is normally made in several parts combining soft and rigid materials that are then put together and sometimes reinforced with a metal shank in a relatively complex assembly process. The purpose of the test was to see how much the process could be simplified by moving to AM and where the new process wins or loses.

Unit sole (Figure 2) – normally injection moulded in a material such as TPU or PVC, it needs a multi-part mould of variable and growing complexity depending on the design features of the sole itself and on the chemical nature of the materials used to produce it. The goal here was to see if, from an aesthetic, functional and cost point of view, 3D printing could represent a valid alternative.

Sole mould (Figure 3) – moulds are important and expensive pieces of equipment. They are normally produced through the NC milling of metal blocks, machined to the high accuracy needed to produce high quality and appealing soles or sole units. Since shoe companies do not possess the necessary know-how and the required machinery, this work is normally subcontracted to specialised suppliers (mould makers), which adds complexity, cost and often inefficiencies in the value chain. The purpose of the test in this case was to investigate if classical machining techniques could be replaced by AM to ‘print’ a mould instead of milling it and also show if and how long it could withstand the temperatures and chemical reactions that form the material in the mould.

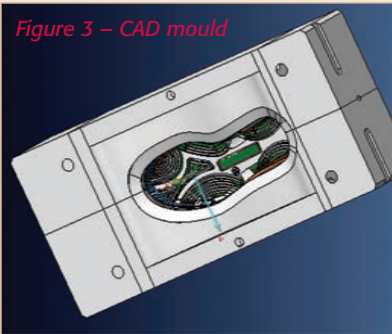
There is one more case that was also investigated (Figure 4) which did not refer to any shoe part or even the shoe itself, but looked at a possible

Results continued

Input – Mould (Figure 3)	
Requirements	The CAD files contain the three parts of the mould; the bottom plate and the two side rings. The mould will be used in a direct bottoming machine, with two rings closing on the last and bottom plate completing the cavity into which PU will be injected.
Materials	Highly rigid material, resistant to high temperatures (minimum 80°C).
Finish	High quality, similar to the one obtained with metal moulds.
Accuracy	High.

Output - Mould (Figure 7)	
Machine	STRATASYS Object 30 Prime
Material	DIGITAL ABS
Amount used	Build material 6886grm, support material 775grm.
Process time	42 hours, 57 minutes.
Cost	€2,280.00 (including support material, wasted in the process).

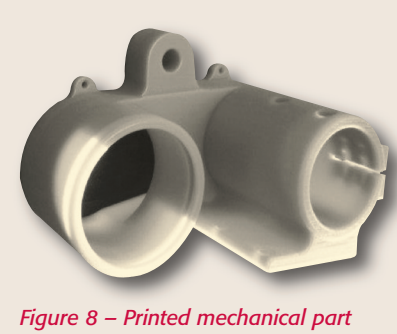
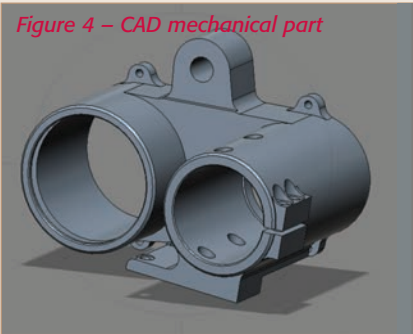
**The three parts of the printed mould look very good, with a high level of finish and a mechanical accuracy that appears acceptable for the moulding process. Some warping and deformation effects were nevertheless visible which necessitated a final machining step to rectify the planarity of the side walls of the mould in order to fit it into the injection machine. These inaccuracies are not expected to affect the final processes. It is thought that the printed geometry could be better optimised leading to a considerable cost saving. The mould is, at the time of writing the article, ready to start injection tests.*



Input – Cutting table (Figure 4)	
Requirements	The CAD files refer to an important and critical part of the tool holder of an NC cutting table. This part is currently made in metal and then assembled with all the other components of the cutting head. High accuracy and durability are called for.
Materials	Highly rigid material, high resistance and durability.
Finishing	High quality.
Accuracy	High in order to allow precise fitting and assembling with other components.

Output - Cutting table (Figure 8)	
Machine	STRATASYS Connex 2 260.
Material	DIGITAL ABS.
Amount used	Build material 275grm, support material 198grm.
Process time	12 hours, 51 minutes.
Cost	€124.00 (including support material waste).

**The printed part is very good, with a high level of finish and accurate dimensions, so it looks perfectly adequate to be installed in the machine. Mechanical assembly tests are due to begin soon followed by endurance tests to evaluate the lifespan and reliability of the AM part.*



application of AM in another segment of the footwear pipeline, shoe machinery. In this scenario the aim was to see if some critical parts of a modern NC cutting table, typically cast or machined metal such as aluminium, etc., could be replaced by a 3D printed copy in an appropriate plastic material while still ensuring the necessary accuracy and durability. A positive result would open fascinating possibilities for digital manufacturing and maintenance.

This benchmarking activity took many months to prepare and some experiments are still on-going so it is not possible, at present, to provide full results and to draw final conclusions. However, some valuable indications are already available that offer a good idea of where and how AM can be applied proficiently. Results are shown in tabular format highlighting initial requirements and final outcomes.

CONCLUSIONS

Taking all four cases into consideration, there are some valuable conclusions that can be drawn on the possible application of 3D printing in

shoe making. The questions raised at the beginning of the article can be dealt with in three main parts: function, cost and quick response.

Function – if we think of the functions the different test objects have to fulfil, the answer is at least dubious. The footbed shows a possibility of obtaining pre-assembled parts directly by the process, which is certainly an advantage, although mechanical properties of the printed parts look to be still too far away from those of the traditional components, at least while we have ‘traditional’ shoes in mind. The distance, however, is not enormous and it is felt the gap could be rapidly filled.

The unit sole also indicates how far the material processed by the machine still is from those in current use. More recently, a follow up of this test was made using a special TPU formulation (Luvosint by German company Lehman & Voss) that can be laser melted. The resulting sole is amazingly good, with a look, feel and mechanical properties that seem to closely match those of real TPU. These physical properties will be



STRATASYS Objet30 printer.

CREDIT: STRATASYS

soon tested against its twin made in real TPU to precisely assess this similarity.

Expectations are higher for the mould and the mechanical part whose functional properties appear to be close

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enough to the traditionally made ones. Tests are being done to assess these properties and when results become available they should hopefully provide more evidence in support of this statement.

Cost – this is the most critical point and one where AM seems to score quite low compared to traditional techniques, at least for most of the objects concerned. It is evident that comparing a footbed that would normally cost around €0.20 with a 3D printed one at €7.50 leads us nowhere even if we take into consideration the higher accuracy and geometric consistency the printed part can offer. The same is true for a sole at €165.00 when the standard cost could be €2.00-3.00 when mass produced in large quantities. The principal cause for this is the extremely high cost of the build material. This will no doubt go down as the market develops in the same way that printer cartridges have but, to what extent, we cannot predict.

The cases of the mould and of the mechanical part are different. AM costs are much closer to those found in

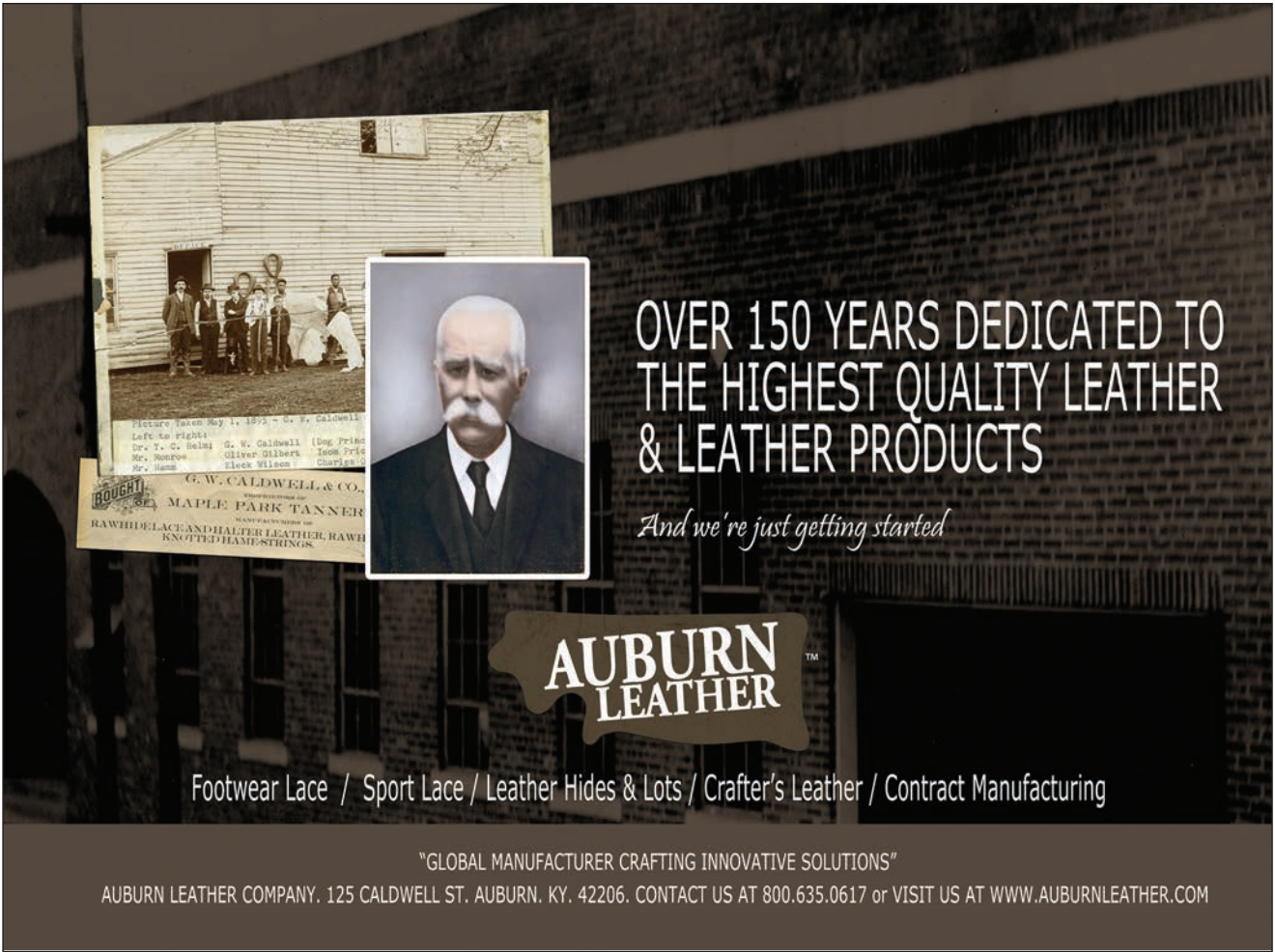
traditional production (or at least not too distant, considering that for the mould to material optimisation or part lightening was done which could reduce the cost by roughly 50%) and, assuming that these objects will perform in the same way (a statement yet to be demonstrated), 3D printing may appear as a valuable alternative, especially in advanced scenarios such as digital manufacturing or digital remote maintenance.

Quick response – this is where we see AM winning in almost every respect. A processing time of above four hours for a footbed, 20 hours for a prototype outsole or even 30 hours for the mould might seem excessively long. However, we cannot forget that in the normal footwear pipeline, these components are procured from external suppliers and their delivery lead time, especially when unit items or very small lots are needed, is counted in days if not weeks. The chance of having the needed component or required mould right in the office by just sending the file to the printer and retrieving the part some

hours later may turn out to be a very powerful driver for additive technologies.

Another approach that is being tried is to increase 'global' throughput by having a battery of printing heads working together in parallel. Twenty working on the same piece and taking 20 minutes to print it produces twenty pieces in twenty minutes or one piece per minute. Dutch research centre TNO is working on a concept of this kind.

Before concluding this analysis, there is one more thing. All that was said holds true of a 'constant product', i.e. assuming that shoes are and will stay the same as they are and have been so far. There are, however, already clear indications that things may change and that new product concepts will appear that will take full advantage of the potentials of AM technologies. Scenarios may combine the easiness of 3D printing with the appeal of personalisation, changing at the same time the business model, product value chain and the very DNA of the shoe itself. 



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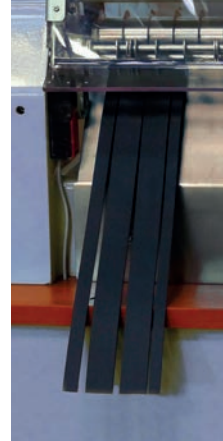
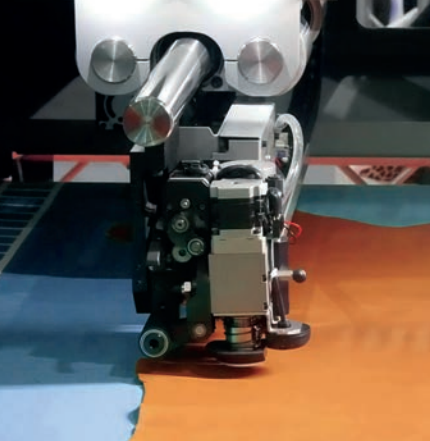
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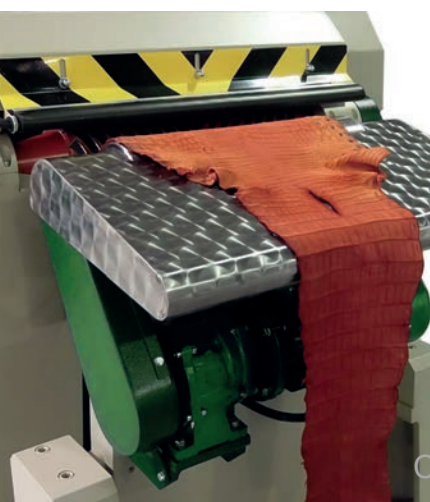


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One stop shopping

The Torielli company has been a noted innovator ever since it was founded by Pietro Torielli Snr. in 1924. This continued under his son also named Pietro who was to become a leading figure in the global footwear industry. It was he who expanded the company into a major shoe machinery supplier with branch offices all over the world. In 1985, his son Giovanni joined the company to continue the tradition.

In 1989, the company joined UK company C&J Clark in the Shoemaster project to develop CadCam software for footwear manufacture. This ultimately led to the forming of CSM3D International Ltd. which Torielli acquired completely in 2004 in order to strengthen its position in the vital CadCam technology field. CSM3D is headed by Ian Paris, an Englishman who had been running Shoemaster for Clarks. The company was now able to concentrate more than ever in developing new CadCam, PDM systems, automatic cutting, production planning and control systems to meet the growing demand for Integrated design and production systems and technologies that increased flexibility and cost reduction.

LOSS AND REGENERATION

Then, in December 2013, Pietro Torielli unexpectedly died. This was a severe shock to both the Torielli family and the company itself as, while no longer active in day-to-day operations, he had remained an inspirational and much loved guiding figurehead. Fortunately, he left behind him a strong, resilient and well-managed company which, after the initial trauma had eased, has been pushing forward under Giovanni Torielli and Ian Paris with an ambitious development programme with which both Pietro and his father would have been pleased.

The company is regenerating itself through investment and the introduction of new personnel to complement existing expertise, and has appointed new distributors and management teams in the main shoe producing areas.



Torielli's modular conveyor can be quickly altered for different types of footwear.

ALL CREDITS: TORIELLI

The main offices at Vigevano are being refurbished and modernised into a high-tech office space complete with a 'virtual receptionist' and new demonstration facilities. The management team has also been further strengthened by Franco Cappiello, an experienced entrepreneur close to the Torielli family, who has now taken on the role of CEO of the group.

LEATHER CUTTING

Computerised leather cutting has become a standard requirement for

today's modern factory, offering improvements in material consumption, consistency of results and reducing the operator skills involved. Always innovators, Torielli has long been at the leading edge of this technology and has now introduced further improvements and innovative solutions. Among these are NestorSC (sample cutting), NestorSR (small production runs) and NestorPC (full production cutting). These are further enhanced by offline nesting systems, automatic and manual nesting solutions for both leather and synthetics.



NestorPC LM 1600 cutting table.

Alongside a long standing collaboration as an OEM for Zund Cutting systems (Torielli add software and projection systems to the Zund cutters), Torielli has now become a producer of leather cutting tables in its own right, with these all designed, engineered and manufactured entirely in Italy. They include the NestorPC LM1600 cutting solution launched earlier this year. It is the first cutting table in the shoe industry to use contact-less linear motors (the same technology used by high-speed Japanese passenger trains). One big advantage with contact-less linear motors is that they do not need the maintenance required by tables based on contact motors. In addition, the high acceleration and control of the speed of the cutters ensures that a premium quality of cutting can be controlled at maximum performance from very fine materials through to robust ones. The system also has an optional laser projection system and is flexible in configuration for use by one or two operators and also for switching between leather cutting, synthetic sheets or rolls of synthetic materials.

INTEGRATED CAD

On the CAD side, there has been much talk in the past in regard to integrated solutions from design to production. While this has previously been something of a pipe-dream, it has now become a reality and companies can now have the luxury of installing a partial solution knowing that if they add to that solution at a later stage they can be confident that all the systems involved will be totally integrated. The process covers components, design, engineering, production planning (material consumption, product costing, technical sheets), leather and synthetic cutting, shoe production (stock control, shoe ordering, production control) and logistics.

Components – suppliers of heels, soles and lasts are now CAD users and are able to supply not just physical products but the CAD data associated with those products.

Design – on the design side, there is a real push within the industry to embrace the use of virtual models and 3D printing. Whilst this will not replace physical samples entirely, it will certainly significantly reduce the overall number of samples and to speed up the development process. In addition, designers are also able to try out more variations of designs.

Shoemaster Creative is a software tool that bridges the gap between creative design and the industrial engineering of the product and allows designers to create their design ideas in whatever way they want using the following design methods:

- Draw (import hand drawn sketches)
- Photo (import photo of prototype shoe)
- Scan (scan a design drawn on a last)
- Illustrate (use a drawing package e.g. Photoshop, Corel Draw to sketch on a last)
- Sketch (use Shoemaster sketching tools to sketch on a last)
- Create (add 2D/3D lines using CAD splines)

These design methods are combined to create 'What you see is what you get' CAD data which ensures that sample or production shoes are exactly as designed in Creative. The designer is able to verify within Creative that everything is correct before any physical shoes are made. The tool also allows designers to experiment with more variations of their designs, creating virtual models to:

- Try a different last
- Change the toe shapes of lasts
- Apply different material colours and textures
- Use different components such as buckles, eyelets, etc.
- Try different sole types
- Try different heel heights and heel designs

Creative ensures that fewer physical samples are required and that 3D printed prototypes can also be produced where necessary. The designer/engineer interface is made



Creative produces virtual samples that can be adjusted by the designer if required, saving the time and expense of multiple physical ones.

Athletic brands spin a new yarn

At a United Nations-hosted conference, adidas made a bold claim. All polyester the German sportswear brand uses from now on will be made from recycled plastic, taken from the oceans. The company's head of global brands, Eric Leidtke, said this equates to 260 million t-shirts per year. "Not only will we be taking 260 million t-shirts out of the oceans, we would not be creating 260 million t-shirts-worth of new polyester every year," he says.

As part of a new tie-up with environmental campaign group Parley for the Oceans, it launched a concept shoe at the event in New York made entirely from yarns and filaments recycled from nets that partner organisation Sea Shepherd retrieved after a 110-day expedition tracking an illegal poaching vessel off the coast of West Africa.

The ambitious idea appears to be an extension of a partnership with music producer and singer Pharrell Williams, and a textile company he has invested in, US-based Return Textiles, which makes Bionic Yarn. Last summer the singer

Adidas is launching a collection made from recycled from ocean waste, while Keen's Uneek design uses 75% new manufacturing methods.

launched his first collection of T-shirts, jackets and caps for adidas made with Bionic yarn, after signing a multi-year contract with the brand. "From the classic track suit, to growing up in Virginia wearing Stan Smiths, adidas has been a staple in my life," said Mr Williams at the time. "This is an exciting partnership for both me and for Bionic Yarn."

But from a limited-edition range of t-shirts is quite a leap from to 260 million, and there will be questions over how adidas will pull this off. Return Textiles was established in 2008 to focus on repurposing plastic bottles – broken down, the polymer is the same (polyethylene terephthalate), so it

Adidas' recycled plastic concept shoe, billed as 'from the sea to the street.'

CREDIT: ADIDAS



can be restructured into a weavable yarn. The 'Bionic' yarn is made with up to 46% recycled material blended with cotton, wool or other fibres. Moncler and Gap were early adopters, and after agreeing to the fabric quality, Timberland created displays in stores to show how it was made.

Return Textiles co-founder Tyson Toussant explained they were approached by environmental campaign group Parley for the Oceans. "It never crossed my mind to think of recycled plastic from oceans, I saw it as a land problem," he admits. "I usually get the recycled fibre from where I manufacture, because I don't want to increase the carbon footprint by shipping plastic bottles from New York to Asia."

The plastic collected from the beaches is difficult to repurpose, adds Return's other founder, Tim Coombs. "But we were inspired to change our company and take on the challenge. Our production staff and our engineers finally commercialised a yarn made from the oceans; we are proud to be part of the solution."

John Warner, an industrial chemist and speaker at the Parley event, thinks one of the reasons for the proliferation of plastic in the seas is that chemists are not taught about toxicity or environmental impacts at university or when they move into industry. "Have you ever asked yourself why there are red dyes that cause cancer, that there are plasticisers that cause birth defects, that there are monomers that are endocrine

Music producer Pharrell Williams invested in Return Textiles to produce his own line of sustainable adidas merchandise.



Plastic by numbers

500bn:

Plastic bags thrown each year

21,000:

Pieces of plastic per km² ocean

600 years:

Time for nets to degrade

8m tonnes:

Plastic entering ocean in 2010

9.1m tonnes:

Plastic entering ocean in 2015 (est)

155m tonnes:

Plastic entering ocean in 2025 (est)

Source: Zoological Society of London/Science magazine

destructors, or that there are plastics that live eternal lives and cause havoc in the oceans?" he asks. His view is that the way science has evolved, chemistry has remained outside of the environmental discussion, something which "has to change now". "Scientists documenting all the problems now are writing the text books for the next generation of chemists to help them understand at the molecular level what is going on, and so when they make the next material, they also know how not to do it," he says.

Adidas' concept shoe was billed as 'from the sea to the street' and a commercially available range is promised later this year, as well as an extended apparel collection using Bionic Yarn. "This is a collective issue," says Mr Liedtke. "The key is collaboration – environmentalists, industrialists, scientists and filmmakers. Adidas knows how to make the products but we need everyone's help in collecting plastics and finding plastic alternatives. Working together is the only way to solve big problems."

Cord construction

Another brand looking into new types of construction is US outdoor brand Keen, which has launched a series it calls Uneek. The result of three years of research and development, Keen says it offers extra comfort because it moulds to the foot.

"The idea started from a few people questioning just how and why we made shoes the way we did and how we could do it differently, and of course we looked at the foot and end use, with the main goal of increasing comfort," Uneek's creator, Rory Fuerst, tells us.

"If you look at shoe production, it tends to use a lot of flat goods cut into small pieces and put back together to conform to a very complex and dynamic 3-D shape, the foot. We just said, let's start with small pieces of cord, conform them to a 3-D shape and see what happens. The other side of it was not adding too much reinforcement or additional structure as

this would take away from the gains made in material and assembly changes. The result was what testers described as 'feels like I have nothing on'. We took this as a good sign, and then it was just a matter of taking those prototypes that we had made at our desk by hand and trying to replicate that feeling over and over again thousands of times."

The brand has this year expanded its team of designers and developers to focus on new product, and hired a design director from Merrell, a development director from Wolverine and a vice-president of product from Ecco.

For Uneek, it worked with existing suppliers to develop the materials and processes and says the key to success was not the supplier's history in traditional manufacturing, but its willingness to try something new.

"Around 75% of Uneek uses new methods," explains Mr Fuerst. "We still use traditional sewing machines for the small micro-fibre pieces and use a traditional stock fitting line for attaching the rubber sole to the PU midsole, but most of the upper and upper-to-sole attaching uses completely new methods."

The process involves a combination of hand work with a progressive positioning system that allows the shoe to be built using no permanent fixing methods that could affect the fit of the final product.

"The most challenging part of the process is controlling cord tension and length, transitioning of the components from one process to the next, and a standardisation of the hand-making process. The system was designed to address these issues and is the only way to mass produce these open-air shoes."

The design was praised as "a superb solution for travelling, outdoor activities and everyday use" by judges at the recent OutDoor Friedrichshafen show in Germany, where it won a gold award. The updated version for spring/summer 2016 features an 8mm flat cord which allows for more colour combinations and reportedly improves comfort.

"The key was not taking the 'easy outs' that would have made it easier to make but would have affected the fit and experience of the final product," adds Mr Fuerst. "When trying something new or trying to change the way you do things, it's all those little yesses or nos that at the time seem trivial and make things comfortable or easier, but when you add these up you find yourself doing it the same old way. We were unbelievably stubborn when it came to making these seemingly small and easy changes, and sticking to our vision. I think that is why Uneek ended up the way it did." 🧠



Keen's Uneek shoes are constructed from cords of recycled plastic. CREDIT: KEEN

IT'S WHAT'S INSIDE...

ORTHOLITE'S ADVANCED, PROPRIETARY AND REVOLUTIONARY OPEN-CELL FOAM TECHNOLOGY SETS THE STANDARD FOR COMFORT AND PERFORMANCE BY DELIVERING A COMBINATION OF BENEFITS UNMATCHED BY ANY OTHER MANUFACTURER.

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The appeal of 'Made in Italy' is the envy of the rest of the footwear world, and yet, when academic Dr Giuliano Noci addressed a group of young industry professionals from all parts of Italy recently, he had to warn them not to waste the opportunity afforded to them by their location and their heritage.

Italy needs to tell its special story better

An academic from the Polytechnic University of Milan, Dr Giuliano Noci, has told young footwear industry professionals that the 'Made In Italy' label is "an opportunity for growth that they must not waste". Speaking in July at the annual general meeting of footwear industry association Assocalzaturifici's young entrepreneurs' group in Modena, Dr Noci pointed out to his listeners that they have a number of advantages. He said that the industrial set-up that exists in Italy, with all the design expertise, machinery and raw materials that footwear manufacturers need available to them on their own doorstep, means the industry there is capable of creating products "of unrivalled excellence".

He said, though, that there is a danger of some producers failing to make the most of this opportunity, of failing to play

their trump card, usually by failing to realise the role that marketing and "brand storytelling" play in today's competitive global market.

Reflected glory

Shoe manufacturers the world over go to great lengths to try to have some of Italy's footwear glory reflect on them and it's not uncommon to see brands from Turkey, India, China and elsewhere apply Italian-looking names to the shoes they make and sell. It's no coincidence that it was an experience in Italy at the turn of the century that inspired three-time best actor Oscar-winner Daniel Day-Lewis to stop acting and devote ten months to learning the art of shoemaking. He was on holiday in Florence and, while walking in the Borgo San Frediano district on the south side



The new generation of footwear company leaders in Italy knows it has inherited a significant heritage in quality and know-how.

ALL CREDITS: MICAM



Italian footwear firms have everything in place: design, materials, machinery, manufacturing expertise. But they must get better at telling the story of Made in Italy.

of the River Arno, became fascinated by the shoemaking work and artistry of the late Stefano Bemer, who had his workshop there.

"What brought them together (and what made me decide to step up and make an offer to continue Stefano's adventure) was perfectionism," explains Tommaso Melani, now chief executive of the Stefano Bemer brand. "Daniel Day-Lewis and Stefano shared the same passion for their respective forms of art: one does not play a role but rather becomes his character; the other would not make shoes but rather give form and matter to his ideas. If you have seen the former acting and the latter making shoes, you know what I am talking about."

Popularity overseas

In 2014, almost 85% of the business Italian shoe companies did was in export markets. They brought in almost €7.5 billion in total for the year. More than 5,000 (mostly small- or medium-sized) firms are involved in an industry that employs 76,000 people in total. More than 40% of Italian footwear manufacturers export more than half of the shoes they produce and fully one-fifth of shoe companies in the country export more than 90% of their output.

It's clear from these figures that Italian companies are committed to providing customers in the global market with high-quality, high-value shoes and that the world wants the product, but Dr Noci's challenge, that they make the most of their Italian credentials, is a less straightforward one for smaller companies to embrace than for larger players with more plentiful resources. His view is that small companies in Italy have not yet been able to develop a deep or mature enough awareness of the role that telling the story behind their brand and their products must play in the competitive



Made in Italy represents "unrivalled excellence" according to Dr Giuliano Noci of the Polytechnic University of Milan.

arena that companies have to exist in today. In terms of the products they make, Dr Noci believes Italian footwear firms pay the greatest possible attention to detail and to quality, but he feels the choices they have made with regard to how best to tap into the qualities that 'Made in Italy' conveys have often been "incoherent".

Heritage of quality and know-how

Current president of the Assocalzaturifici young entrepreneurs' group, Gilberto Ballin, helps run his family's high-end footwear firm, Moda di Fausto, which has its headquarters in the Riviera del Brenta cluster near Venice. He says he and his colleagues feel responsibility for "the great heritage of quality and know-how" that they have inherited from previous generations of Italian shoe producers. He says the Italian industry's young generation is also aware that this heritage can offer it a competitive edge and that social media and information and communication technologies can play an important part in helping them achieve this. Gilberto Ballin also acknowledges that footwear firms can learn from the experience of Made in Italy brands from other sectors.

A focus on social media is one of the things Giuliano Noci (who publishes on Twitter his own 'daily newspaper', a set of online news stories from around the world of interest to him and his followers) is most keen on. In truth, though, the message matters to him more than the medium. "Italy has an incredible story to tell," he concludes. "Italian culture is already well known and well respected in Europe and in other western countries, but we are not so well known in China, not yet anyway. But I would say people around the world are positively predisposed towards Italy. We have to tell Italy's story." 🗣️

*The Swedish brand started
life as a backpack specialist
and now turns over \$82.5m.*

ALL CREDITS: HAGLOFS



Haglöfs extends sustainability aims

For Swedish brand Haglöfs, sustainability is moving further up the agenda. After last year launching its Take Care label for clothing, it is now turning its focus to footwear. The aim is to be a “leader in sustainability” in the outdoor sector, a path it embarked on in 2008 with an overhaul of products and process and something it now feels confident to promote.

For an apparel product to carry the Take Care hangtag, it must be bluesign approved, made with 50% or more recycled content or made from organic cotton. About 60% of the company's products were marked with the symbol for autumn/winter 2014, and this has increased to 75% for autumn/winter 2015.

“It's not really a label, it's a communication tool for making it easier for end consumers to make sustainable choices in shops,” Haglöfs' sustainability director, Lennart Ekberg, tells us. “That's been one of the biggest problems; there are a lot of companies with sustainable inputs in their products but it's extremely difficult for the end consumer to find it. We also wanted to put a really high standard on what demands we have for the products to fit into the Take Care label, otherwise we could be accused of greenwashing.”

After positive feedback from consumers and retailers, Haglöfs has decided to extend the Take Care concept to its footwear. Starting with the autumn-winter 2016 collections, for shoes to make the Take Care grade, they must either be made of ‘sustainable leather’ or contain a bluesign-approved or recycled material.

The company recently joined multi-stakeholder body the Leather Working Group, which was established in 2005 by footwear brands to audit tanneries on environmental performance and rate them as gold, silver or bronze (or fail). There are more than 160 tanners from 21 different countries participating in the programme. Haglöfs says it will transition to exclusively sourcing sustainable leather from gold-rated tanneries – the standard it classes as ‘sustainable leather’.

“It's not hard to source from only gold-rated tanneries, we have already done that for some time,” says Mr Ekberg. “For spring 2016 we have a couple of issues with leather from gold-rated tanneries, but it's not that difficult.”

Haglöfs' target is stricter than most. Timberland and adidas aim to source from only silver or gold rated tanneries but many brands say a successful LWG audit is enough. Puma sources from gold, silver or bronze and Vans is “following [sister brand] Timberland's lead” and a quarter of its leather in 2013 was from an LWG-rated supplier.

For tanneries to receive and maintain gold status, they must prove that they are continuously improving, and must be reaudited every 18 months or so, which some tanners have suggested can be costly and tricky, particularly as tighter standards came into effect last year. In some cases, tanneries drop down a status while they work to fix issues, or are

The Swedish outdoor brand has set the bar high so there can be no accusations of greenwashing, and has introduced a set of criteria for footwear to carry its Take Care label.

temporarily unclassified. Whether or not this would mean Haglöfs would change supplier is unclear.

“The Take Care standard for footwear was only settled in spring before OutDoor Friedrichshafen,” explains Mr Ekberg. “We are currently looking over our leather supply chain, so if we need to make some changes, we will.”

Recycled shoe parts

For the non-leather products or elements in the shoes to be part of the Take Care collection, at least 70% of the upper needs to be made of a bluesign-approved or recycled material, and the midsole and/or outsole must contain either bio-based or recycled material. Bluesign is a Swiss audit company that uses Input Stream Management to vet production processes and inputs. To obtain approval, a material must be free from harmful substances;



The Take Care label is an indication of products made with greener processes.



Haglöfs' sustainability director, Lennart Ekberg.

manufacturers must minimise harmful emissions to water, soil and air from production processes, monitor and reduce resources, and ensure working conditions meet health and safety requirements.

Haglöfs is unable to cover all its needs with bluesign materials, but has been working to get suppliers to improve their manufacturing production so they are able to supply bluesign approved material. This has varying degrees of difficulty depending on the supplier's location. Some countries have an industry with clear vertical integration, where there are short distances between those who spin and weave fabric and those who finish it. Sometimes the parts are under the same roof, so the approval process is easier. In other countries the distances are greater and therefore becoming a bluesign partner is then a more complex process.

In November 2014, Haglöfs said 40% of its footwear products were to be made with recycled materials from this year. Mr Ekberg admits sourcing these kinds of product for footwear will prove more difficult than on the apparel side. "Sourcing recycled materials for footwear is a bit more difficult," he says, "and the same with bluesign-approved textile footwear materials; they are a lot more difficult to source."

Fewer footwear materials manufacturers go through the bluesign approval process, which can be costly for companies, especially if they consider that there is not sufficient demand.

"There's no end consumer who wants to have a functionally inferior product just because it's sustainable," adds Mr Ekberg, "so we are closely following the technical developments and if there are possibilities to use some of these sustainable developments in our products we are doing that, but without making the product functionally inferior, that's extremely important."

In its 2013 sustainability report, it stated that from the 2016 season, all products were to be developed as Take Care products and anything else would be the exception. The follow-up report in 2014 doesn't set such targets, instead stating that 65% of its apparel products were bluesign approved and 75% carry the Take Care label. The limitations further back up the supply chain make rigid targets difficult.

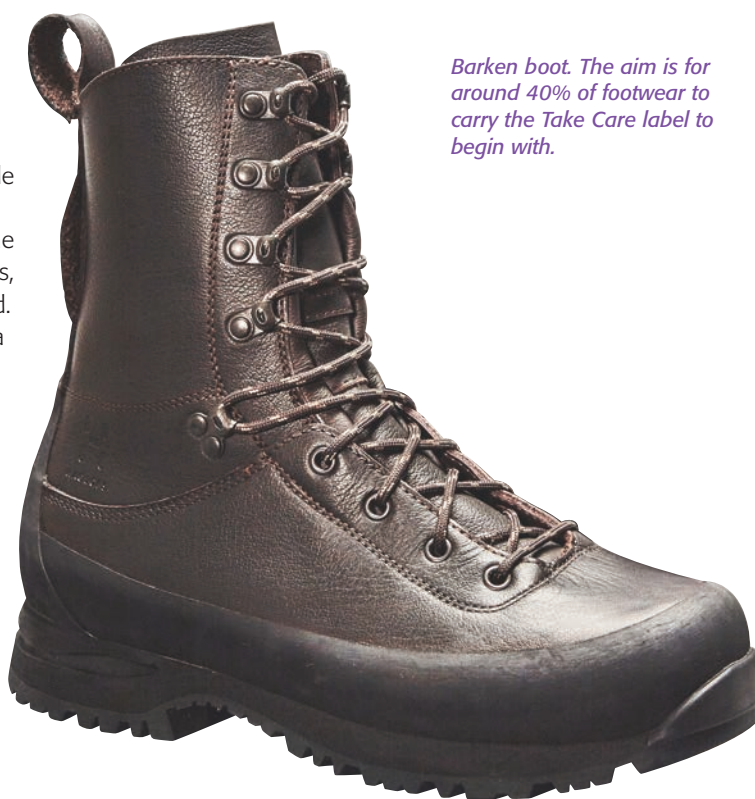
"We are involved in a lot of research projects so we know what's possible and not possible, what's good or not good, and commercially available. For that reason it's difficult to have a timeline or target in terms of percentages, so we say we have a clear ambition to improve every year."

Growth story

With the arrival of CEO Peter Fabrin last November came a series of senior appointments and an even greater focus on strengthening relationships with customers and consumers "to ultimately take Haglöfs from being a good company to becoming an exceptionally great company".

The brand marked its 100th anniversary last year and has come a long way from the backpack maker in a small Swedish town with a handful of employees. When Mr Ekberg joined in 1989 as a designer he helped to grow the product range and the first hiking boots were offered in 1994. By the early 2000s, clothing had overtaken backpacks as the main driver behind the brand's development and the company was bought by a private equity firm and subsequently by Asics in 2010. It cites the close collaboration with the Japanese group as the reason it has made strides in the footwear sector and includes shoe factory inspections in its Fair Wear protocol – a standard aimed at ensuring workers are paid fairly and work in acceptable conditions. Haglöfs now sells into 26 markets, directly employs 200 and has an annual turnover of \$82.5 million.

"Haglöfs is now often an advisory party to others with whom we initially sought contact with to learn from, from authorities to standard-setting organisations," adds Mr Ekberg. "In future, sustainability will be a prerequisite for doing business. We are well positioned, but we still have more we want to achieve." 



Barken boot. The aim is for around 40% of footwear to carry the Take Care label to begin with.



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